

MOTOR AGE

Vol. V No. 8

FEBRUARY 25, 1904

Ten Cents





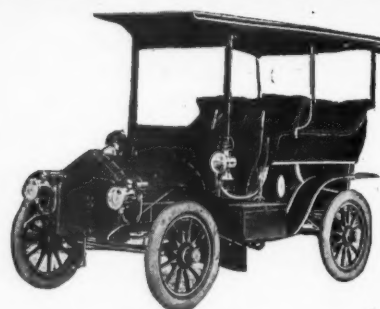
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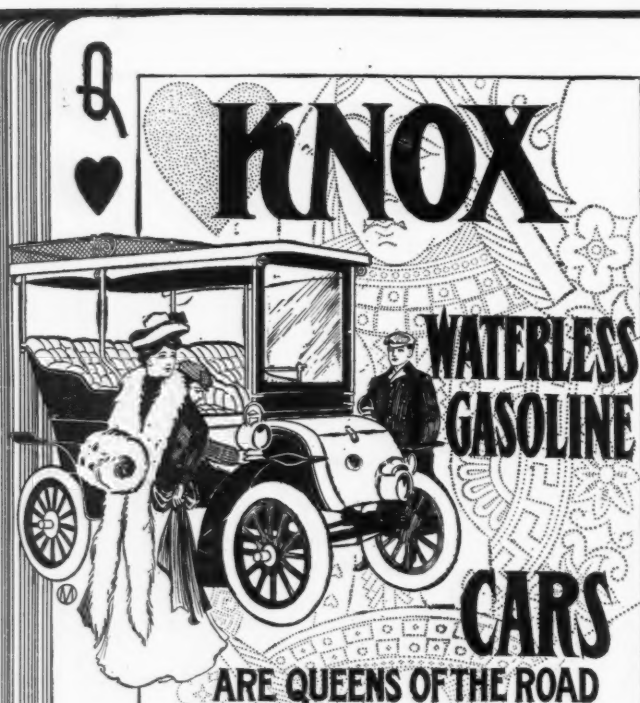
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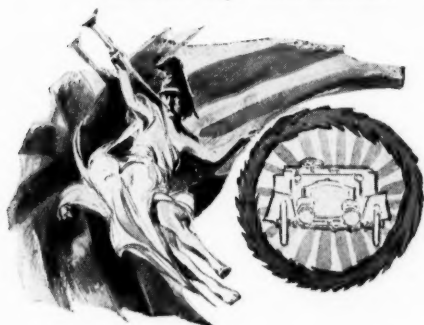
MOTOR AGE

VOL. V. No. 8

FEBRUARY 25, 1904

\$2.00 Per Year

THE CARS AT THE GREAT LONDON SHOW



LONDON, England, Feb. 13—Special Correspondence—The exhibition under the auspices of the Society of Motor Manufacturers and Traders which opened yesterday in the Crystal palace and which continues until February 24, is by long odds the greatest event of the kind ever held in England. The great building is crammed with vehicles and appurtenances, and were there a lot more cars to be shown they could hardly be displayed without utilizing some of the side courts which are not at all suited to such purposes. As it is, the available side courts have been taken possession of by the motoring fraternity, and thus Crystal palace was never before so full of any one thing as it is this week of motor cars and things relative to them.

Of course the show is not another salon d'automobile borrowed from Paris. It could not be. But it is so much greater than any of the British shows of last year that the true Briton cannot but feel that it will not be long before the Crystal palace houses each year the representatives of as great and varied a production of motor cars as does the Grand palais.

As a mechanical study the show is a real treat, but a somewhat tantalizing one. Just as at Paris, there are so many cars on which novelties are seen that the person viewing the show cannot readily gain any impression of tendencies in design and construction. Only in the broad measure of general impression can the progress of the British industry during the last year be gauged without careful and scrutinizing study. Hurriedly, with view to catching a post, a closely drawn mechanical critique of the show is impossible.

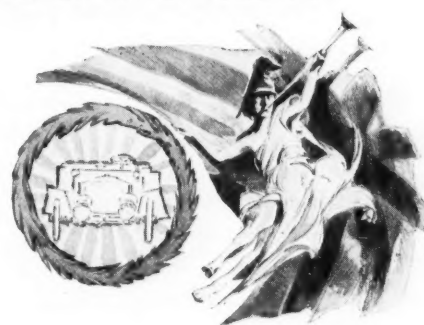
Imagine a great, glass-roofed hall 1,200 feet long and over 100 feet wide and filled with motor cars; imagine all sorts of ramifications from it and all filled with motor cars. Then you have the Crystal palace show, with its 10,000 electric lights, which are not enough to brilliantly illuminate all of the displays,

The main floor, or nave proper, the top corridor, the transepts, the spaces around and back of several entrances, and several of the side courts are crowded with motor car and appurtenances displays. Alongside the orchestra pit is the exhibit of clothing and similar articles, while down in the lower hall all of the heavy commercial vehicles and the marine motors are grouped.

From this immense jungle of the British motor industry's proudest beauties a few lines of commercial tendency are broadly, plainly marked—other and finer distinctions lose their course in the maze of differences.

In running gears there is a marked increase of wheel base, showing the appreciation of the French makers of the necessity of longer cars to have been duplicated in Great Britain. The increased length applies to all classes of cars. Comfort has succeeded speed in motor car building. Racers are racers; touring cars are touring cars. Long wheel bases are a part of a modern road car. Small cars are seen galore with 6½ and 7-foot wheel bases; 9 and 10-foot wheel bases are not exceptions in heavy tonneaus.

The pressed steel frame is in vogue, though



as at the Paris show there is a great division of practice in running gear frame structure. Tubular, angle and channel iron frames are all represented by reputable makes, while aside from the pressed frame the armored wood frame has the most representatives. In all running gears there is a decided tendency toward abandoning or simplifying the sub-frame.

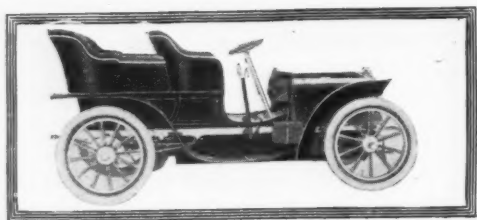
Motor car bodies show a great refining influence. Whether this is the result of the work of the many notable carriage makers who have entered the automobile body building field or whether it is simply a feature of the natural progress of the motor industry is undeterminable. It is certain at any rate that not only have many new and probably useful forms of bodies been devised, but their construction and upholstering tends more to comfort and their finish is much more excellent. Some of the finishes border on the gaudy, but on the whole color and decorative effects are in good taste and high class. Side entrances to tonneaus are sufficiently numerous to warrant the belief that this form of body will become a standard pattern. Glass fronts with folding rear hoods and canopy tops are in great profusion, while adaptations of the limousine are common, even on moderate price touring cars.

In motors there are few freaks or actual novelties—several of the features brought out tentatively a year or two ago have become more or less general fixtures, but there are no sweeping innovations. Mechanical inlet valves are more numerous and nearly every motor has some sort of carbureter in which the mixture is automatically controlled in quality according to the variance of motor speed and consequently of total of fuel intake. There is a smaller proportion of individually cast cylinders than at the Paris show, but this construction is gaining notably. The cellular radiator is everywhere. The slight check in its popularity which seemed to be indicated by the French



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THE SHOW POSTER



MOTOR AGE

THE CHENARD & WALCKER

show is not noticeable here. However, many of the exhibitors—and some of the best among them, too—have stuck to the tubular radiator with flanged or ribbed water cooling pipes.

In the number of cylinders there are two popular departures, the unexpected adoption by many makers of the three-cylinder motor and the creation of several very attractive six-cylinder models. In either case the obtaining of a mechanical balance seems to be a principal object. The increasing flexibility of motors has led to a cutting down of speed changes and many cars of makes in which formerly three or even four forward speeds were provided have only two speeds. Direct drive on the high speed is almost universal, but it is a minority of the sliding gear transmissions which are so arranged that there are no idle gears running when on top speed.

While monster cars are numerous, the 8 to 12-horsepower patterns represent the rank and file of the industry and seem to be the most popular among the purchasers.

Altogether the exhibition shows a decidedly rational adaptation of the motor car to the uses of the general public. The spectacular has been buried in the practical and the practical has become recognized as such by the public. The Americans claim they are on the verge of rivaling France in automobile production. England also is to give la belle France a close race.

Below are briefly mentioned some of the principal characteristics of prominent cars at the Crystal palace:

STAR ENGINEERING CO.—In main features the Star cars follow Panhard practice, and the little single-cylinder, 6-horsepower car, which is shown for the first time, is a miniature of the larger cars in this respect. This company also shows the detachable Cape cart hood, which it claims to be the first to adopt for motor purposes.

SPEEDWELL MOTOR & ENGINEERING CO.—The new Leon Bollee car with the Bollee carburetor is shown for the first time. This is really two carburetors in one, and as the speed of the engine increases the second carburetor is automatically opened by the governor. At low speeds the engine works from the smaller volume of the mixture furnished by the smaller carburetor. The engine and gear are flexibly suspended, so that these parts can move to a limited extent on the frame. Flexibility is the talking point of the engine power and mechanism throughout.

B. THOMPSON & CO.—One of the features of the Achilles car are long phosphor bronze bearings fitted to the back axle, so that if the balls should fracture, plain bearings come into action.

WESTON MOTOR SYNDICATE—In the Chenard & Walcker car the frame is of the fitch-plated wooden type, with spring hangers bolted in position. This frame is stiffened when necessary by transverse channel steel members, and carries the motor and gear box on an under frame of similar section. The motor, flywheel, clutch, clutch brake and gear box are all en-

closed beneath by a shaped sheet steel apron bolted to the main frame. The engine has four cylinders, and all the valves are mechanically operated, the exhausts being on the right and the induction valves on the left. The rear axle drive system has undergone a modification in design. The fixed weight carrying axle is swept downward as to its central portion, so as to allow the gland bearing of the differential gear box taking the driving bevel spindle to pass over it, the live axle being now set at the ends in the same horizontal plane as the fixed axle. All the axles and shafts throughout the car are carried in the same horizontal plane.

S. A. MARPLES—The Mercury two-cylinder and Windora four-cylinder cars have mechanically operated inlet valves, automatic carburetor, fan flywheel, sheet steel clutch, differential gear, and countershaft coupled by flexible joint to the change speed gear. All control is concentrated on the steering wheel.

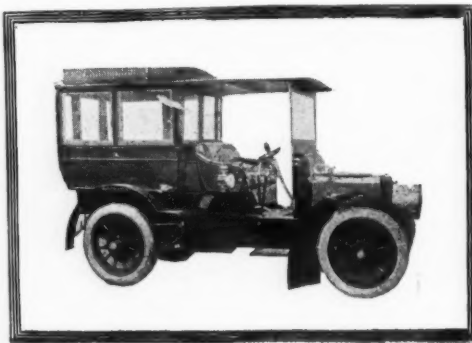
JOHN MARSTON—A new six-cylinder car is shown, the cylinders being cast in three pairs, with mechanically operated valves with variable inlet, the cams being tapered so that the variation is obtained by sliding the valve shaft. The clutch is metal to metal, running in oil; direct drive on the top speed. Metal to metal brakes running in oil are also fitted.

NEW ORLEANS MOTOR CO.—This company's car has a number of special features. The four cylinders are cast separately. The clutch is of the inside type, so there is no thrust when it is working, and special provisions are made for accessibility to the whole clutch. The gear box is joined to the base chamber of the engine by an aluminum extension, which also serves as a protection for the clutch, the motor and gear box being practically in one piece.

RYKNIELD ENGINE CO.—The cars of this company are exhibited for the first time at a motor show. The motors are all 10-horsepower and the models include a touring car, station cart, light delivery wagon and a victoria. The cars have duplex clutch, steering and controlling devices of new design.

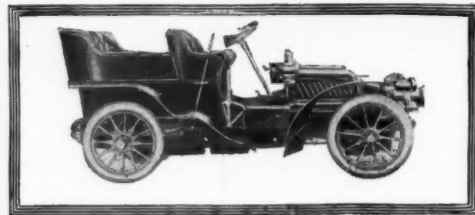
SIDDELEY AUTOCAR CO.—These cars have mechanically operated inlet valves, worked by the same cam shaft as the exhaust, and placed above them, with variable lift, controlled from the steering wheel. The transmission is very strong and ample provision is made for flexibility of drive. The 12 and 18-horsepower cars have vertical engines and the 6-horsepower has a horizontal engine, with the Wolseley type of transmission.

SIMMS MFG. CO.—Among the new features are the Simms-Bosch high tension magneto ignition, spark-advancing device, a new plug, Simms patent automatic carburetor, irreversible steering gears, detachable clutches, dust proof universal couplings, new water cooling pumps and a combined hand and foot accelerator.



MOTOR AGE

THE MAUDSLAY



MOTOR AGE

THE ARIEL

STANDARD MOTOR CO.—The two-cylinder cars shown have an engine of 5-inch bore and 3-inch stroke with mechanically operated valves, four speeds forward and reverse, and an automatic carburetor.

GOBRON MOTOR CO.—The chassis of the 25-horsepower Gobron-Brillie is shown with its tandem engine. The clutch has a small metallic leading cone in the center and a surrounding conical, leather-lined truncated cone of the usual form. One of these cars is exhibited on the grounds, driven by Duray, the holder of the flying kilometer record of 26.25 seconds.

HEWETSONS, LTD.—The special features of the Benz-Parsifal cars are the gear drive, governor acting on the inlet valve, clutch running in oil bath, internal dustproof brakes and pressed steel frames.

LANCHESTER ENGINE CO.—In the new patterns the two-cylinder engine, silent worm drive and epicycloidal gears remain about the same as last year, though some minor improvements are noticed. Ball and roller bearings are fitted to the crankshafts, crank axles, change speed countershaft, wormshaft and road wheel bearings. Wood wheels with special form of spoke are shown on some models. A section of the balanced engine is shown.

LEA & FRANCIS—The main features of this car are a three-cylinder horizontal long stroke engine, connecting rods of great length, so that the angularity of the thrust from the crankshaft to the cylinder wall is reduced to the utmost; mechanically operated inlet valves, direct drive on second and third speeds, indirect or compound on the first and reverse; live back axle of original design, H section tapered steel frame, side entrance and long wheel base.

LONDON MOTOR GARAGE—The Pipe cars shown have mechanically operated inlet valves, internal expanding brakes and control from steering wheel. The Jenatzy magnetic clutch is shown at an English exhibition for the first time.

MANN & OVERTON—In the Georges Richard-Brazier car the carburetor is made with two jets inclined toward each other at such an angle that when the suction of the engine causes the gasoline to spurt through the jets, it issues and mingles with the air and takes the form of the flame of acetylene lamps. It is claimed that this delivery makes the most perfect mixture, while the resistance afforded by the impact of the angular jets prevents the delivery of too much gasoline as the speed of the engine increases. In addition to the permanent air feed, a pierced ring around the hot air pipe is provided so that the carburation may be varied to suit different hygrometric conditions. The gear gives four speeds forward and reverse, the fourth speed being on the direct drive.

DE DION-BOUTON, LTD.—The 6-horsepower car, which has been especially designed for doctors, has three seats with leather hood, glass wind shield, side doors and solid tires. The 12-horsepower car is a long wheel base convertible brougham or double phaeton,

DENNIS BROS.—These two and four-cylinder cars have mechanically operated valves, high tension rotary magneto ignition, pressed steel frame, new gear box, spring drive taking up the shock from the engine, worm drive to the back live axle, push pedal for throttle control, and Longuemare carbureter with automatic air supply.

DURYEA CO.—The three-cylinder car is shown in 12 and 15-horsepower. It has an inclined engine in the center of the car, epicyclic gear, two speeds and reverse, single chain drive on to one-piece balance geared live axle, direct drive on the top speed, new forecarriage with triangulated bracing, inclined steering centers, all steering connections in tension, one hand control, with throttle on the steering handle and a new governed automatic carbureter.

EAGLE ENGINEERING & MOTOR CO.—In these cars the engine is governed by the inlet, and there is a special design of tool boxes connecting the front and rear mud guards. There is a honeycomb cooler and fan, three speeds by sliding gear and a new pattern bonnet. A single cylinder, three wheel car is shown.

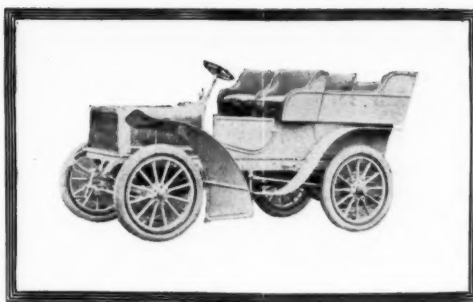
S. F. EDGE, LTD.—The six-cylinder Napier attracts especial attention as being one of the highest powered cars yet produced. In the improvements noted is a new specially strong radiator for forced draft, high tension synchronized ignition. All wires leading to the commutator are stationary. Only one coil and one brush are required. The carbureter is a Napier hydraulic, the steering gear is adjustable and there is a metal to metal friction clutch. The general features of the Gladiator cars are wood frame strengthened with steel fitch plates, engine and gear mounted on steel underframe, self thrust clutch, sliding gear and chain drive. The 18-horsepower car has a side entrance.

BELSIZE MOTOR CAR & ENGINEERING CO.—The Belsize Junior is a new two-seated car with 7-horsepower single cylinder engine, mechanical inlet valves, governor, geared pump, central chain drive and stamped steel frame. The Belsize engines have been equipped with mechanically operated valves for 3 years.

DEASY & Co.—The special features of the Martini cars shown at this exhibit are four cylinders, Simms-Bosch rotary magneto ignition, mechanically operated valves, pressed steel frame, honeycomb radiator, throttle lever on the steering wheel, double acting brakes, countershaft brake, water cooled, and ball bearing throughout.

BROUHOT MOTOR CO.—A new device to prevent undue jolting over bad roads is one feature shown, and the carbureter is so designed as to insure a thorough mixture of gasoline and air.

BRUSH ELECTRICAL ENGINEERING CO.—One improvement on the 18-horsepower car is a clutch with compensating joint to take up the drive without any appreciable shock. There is oil lubrication to all bearings, mechanically operated valves to the engine, and an arrangement automatically retarding the motor upon



MOTOR AGE

THE RANFIELD

pressing either of the pedals or applying the hand brakes.

CENTURY ENGINEERING CO.—The special features shown are improved double acting brakes, patent automatic electric light for illuminating the gear change sector at night, and the engine governed on induction.

DAIMLER MOTOR CO.—The special features of the new four-cylinder cars include slow running engines, suspension of engine and gear direct on the main frame, no underframe being used; mechanically operated valves, single trembler coil, automatic carbureter. A facsimile of the king's Daimler car is shown.

A. DARRACQ & Co.—The 30-horsepower four-cylinder Darracqs are exhibited for the first time in England. The special features of these cars are sheet steel frames, stamped in one piece, forming bed plate for the engine and gear box, and bringing the carriage body 6 inches lower.

ARIEL MOTOR CO.—These cars have mechanically operated and interchangeable valves, high speed engines, automatic carbureters, honeycomb radiators cooled by fan, control from the steering wheel, gear-driven throughout, and variable lift to the inlet valve operated from the steering wheel. The car used in the Snowdon mountain climb is shown, as is also a set of bevel gears which have been run over 20,000 miles.

MAUDSLAY MOTOR CO.—This exhibit consists of a 25-horsepower wagonette omnibus, an 18-horsepower double phaeton, and an 18 and a 40-horsepower chassis. The omnibus is fitted with a convertible body, and when the omnibus top is removed a touring car is formed. The 40-horsepower chassis has a six-cylinder engine, driving through a leather-faced friction clutch to the gear box, contains four speeds and a reverse, operated by a single lever, and thence by side chains to the rear wheels.

ALBION MOTOR CAR CO.—The special features include mechanically operated inlet valves, magneto ignition, Murray patent governor, spring drive and protected driving chains.

ALLDAY & ONIONS—A new pattern three-seated car is shown. The tonneau has two seats with a front entrance, and there is a bucket seat for the driver. The engine has mechanically operated inlet valves, and the change speed gear gives two forward speeds and reverse with direct drive on the top speed. It has a live axle with cardan shafts between the engine and gear box and between gear box and live axle. The axle runs on long, plain bearings, but is provided with balls to take up the side thrusts from the bevel drive. It has metal to metal expanding brakes, long springs and is strongly constructed throughout.

ITALY HAS A GOOD SHOW

The automobile show of Turin, Italy, was opened February 6 by the duke of Genes, who represented the king. Other royal personages and a very large number of noblemen mingled

with the several thousand invited guests. There were fully 5,000 people present. There were seventy-one automobile, accessory, motor bicycle, motor boat and bicycle concerns represented at this show. Of this number thirty-one were foreign, of which twelve were from France, five from Austria, four each from Germany and Belgium, and three each from the United States and Switzerland. The more important cars on exhibition were the de Dion-Bouton, F. I. A. T., Oldsmobile, Electromobile, Panhard & Levassor, Gobron-Brillie, Darracq, Charron, Girardot & Voigt, Mercedes, Krieger, Martini, Benz-Parsifal, Peugeot, Clement-Bayard, Ceirano, Rochet-Schneider, Mors, Decauville, and Serpollet. Among the most conspicuous motor bicycles were the Rambler, Peugeot, F. N., Wanderer, Knapp, Moto-Cardan, Quagliotti, Sarola, Antoine, Rosselli and Invecta. The F. I. A. T. company, the Societe des Bateaux Automobiles de Milan, Magnani et Lunini of Genes, and Serpollet, Hurty and Darracq, of Paris, exhibit motor boats. The display of appurtenances and parts is the most extensive ever seen at any Italian show.

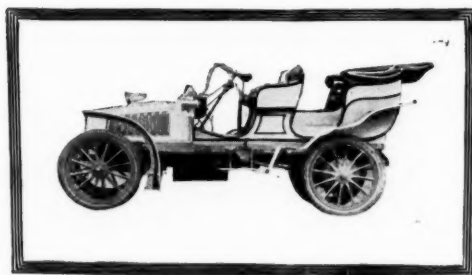
One of the features of the exposition is the Renard military road train, first shown at the Paris exposition last December. The 200-horsepower Dobelli car is another attraction. According to the maker of this car it will prove the fastest automobile ever built. It will be sent after all short distance records at the close of the exposition.

The regular Italian touring cars show great improvement over last year's models. They are built with much finer finish, and with a view of attaining the greatest comfort. There are few really important novelties, as the general tendency is that of copying French and German styles. The attendance averages 2,500 people per day. One of the features was the attendance of 400 workmen from different automobile factories in Milan.

HOLLAND'S FIRST SHOW

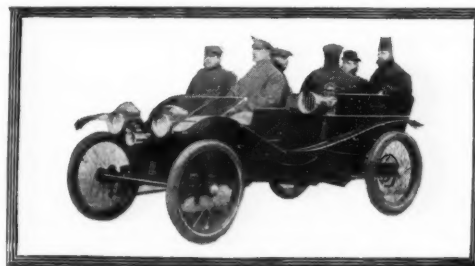
The first great automobile show held in Holland was opened February 12 at Amsterdam by Jonkheer Boreel van Hogelanden, mayor of Haarlem and president of the Nederlandsche Automobiel Club. In a short address the president referred to last year's endurance run, which was the beginning of the automobile enthusiasm in Holland and which did more for the pastime than all other previous efforts, inasmuch as it gave a chance to the country people to see what automobiles are and what they could do. There were sixty exhibitors in the hall, including a number of bicycle manufacturers. The principal French, German and Belgian automobile and motor cycle manufacturers made displays.

A few years ago a western young man rode a bicycle a mile down hill with the wind in his back in 2 minutes 16 seconds, and the world marveled. Now with the automobile mile record at 39 seconds on the level, wonder at it has been quickly swallowed up in preparations for doing 2 miles a minute.



MOTOR AGE

THE THORNYCROFT



MOTOR AGE

THE LANCHESTER

MOTOR AGE

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MOTOR CARS FOR WOMEN

THE AUTOMOBILE is the best vehicle on earth for women to use. It is safer, more convenient, more reliable and more efficient than the horse and buggy. Hundreds of women have learned this; hundreds more learn the same thing each season. Automobiling has reached the end of the beginning. The demonstration by pioneers that it is a practical vehicle has been accomplished. It is even unnecessary after the arduous but successful affair last fall to hold endurance runs that the efficiency of motor cars may be shown. It has been proven and is generally known. Automobiling is now in the process of common acceptance—in the stage in which the public adapts itself to the new vehicle and the new vehicle is adapted to the varying requirements of the public. Automobiles can go anywhere, render any kind of service, beat any other kind of road transit. This broad statement of their worth applies just as much to their use by women as to their use by men. They are not only the mediums of great speed, of great power, of great endurance. They are pleasure vehicles without peer and may be adapted equally well to the leisurely travel of milady. The automobile is stylish; its mediums of control are sure; its response to the guiding hand are quick; its temper is even and never ruffled; it has no fear; it is comfortable; it is clean; it furnishes the intoxication of motion without the effort of walking or bicycling; it is as well suited to the purpose of shopping, calling or matinee going as to the purpose of park or country pleasure riding.

Women have shown that women can manage an automobile without assistance, and have also shown that, if necessary, they can care for it as well. Prejudiced ones may call attention to the fact that women may not delight in fussing about an oily, greasy, perhaps dirty, mechanism. They do not have to. The maintenance of the car in good running order may be left to other hands and still the automobile is just as much under their own supervision as the horse and buggy they are accustomed to use. It is not presumed by even the most devoted horseman that the stylish young woman who drives her equally stylish team and trap down the stylish boulevard of a bright afternoon attends personally to the maintenance in good order of that trap and team. The oat

bucket and the curry comb and the hay pitchfork are used by other hands than hers. The rig is hers to use; its care is for others. It is not a fair comparison between the horse and the motor to overlook the disadvantages of the former in pointing out the necessary care entailed in the use of the latter. Were the young woman in the case compelled to choose between caring for a trap and team and caring for an automobile, gasoline, steam or electric, doing every bit of the necessary work herself in either case, it is almost certain she would choose the maintenance of the automobile. The amount of disagreeable work connected with its maintenance is less. Persons are apt to look upon work which they are accustomed to do as incidental, while a new brand of work, though perhaps less arduous to obtain equal or greater results, is held in the light of a serious disadvantage of the medium necessitating it. Suppose, for instance, there is a small city in which there are 500 horse drawn outfits. The total of work necessary to keep these rigs in good running order is greater than would be the total of work necessary to maintain an equal number of automobiles. In such a community probably half of these vehicles would be for pleasure and half for business. One-fourth the number of business automobiles would accomplish the same amount of work as the commercial horse drawn rigs of the town. Hence the total of work by the substitution of automobiles would be reduced almost 40 per cent, even were the amount of maintenance work of each individual vehicle the same in each case. But the townspeople are apt to forget the hours and hours spent in taking care of their horses and wagons; they have done it so long it is to them a part of existence. The work of maintaining a motor car is to them an unreasonable procedure. They would recognize superiority in the automobile were it a vehicle that could run and run and run and keep on running just by pushing a button. They fail to see the fairness in offsetting the work required to utilize the horse and the disadvantages of his service against the work of maintaining an automobile and the disadvantages of its service. The prejudiced critic of the automobile never realizes the fact that the automobile does more than the horse and buggy, when comparing its service with that of the old style of conveyance. It might be a revelation to horse advocates were automobile makers to put out a few small automobiles which would do just what a horse does and no more; that the scoffers then might see the difference in cost, convenience and maintenance. It is unreasonable to expect a machine which can go over the roads at 40 miles an hour, hauling seven or eight persons, to be maintained without cost and no work. It has been shown that it can be maintained at less cost and with less labor than a horse drawn vehicle doing half or one-quarter the real work. Suppose an automobile were built whose maximum speed were 10 miles an hour for 3 or 4 hours at a time, or which might be driven all day at 6 miles an hour, hauling two persons; which would be allowed to stand unused 12 out of every 24 hours; which would require an hour's work morning and evening to be kept in working condition and with extra work cleaning the carriage, etc.; and which could not be stopped at 8 miles an hour inside of 20 feet. This would be a poor automobile, but it would be an automobile which would equal the service of a good horse and buggy, and at a very much smaller cost of operation. Automobiles for women possess all of the advantages over the

horse and buggy that do automobiles for men. They are eminently more efficient than the horse drawn conveyance and require less work, whether this be of operation or of maintenance. If the automobile is preferable for the business and pleasure purposes of men, they certainly are preferable for the social and pleasure purposes of women.

WITHOUT SPEED CHANGE GEARS

EACH YEAR of its development the gasoline motor as applied to automobiles becomes a more flexible power producing medium. Almost as wonderful as the change in vehicle construction during the last 3 years has been the improvement in motors, and this season almost every American maker counts flexibility as one of the chief advantages of his motor. Great range of speed control of the motor lessens the necessity for speed changes by mechanical means in the transmission of power to the driving wheels; the greater the flexibility of the engine the less the utility of speed change gears. It is common practice to run cars entirely on the high speed or direct drive except in starting and climbing unusually steep grades. With many cars it is possible to vary the speed from 4 miles an hour to the maximum speed without changing the gears. It is reasonable to suppose that this increasing flexibility of motors will continue. It is possible that it will reach a point at which the reduction of speed is accompanied by such a favorable differential ratio of power reduction that the use of the transmission speed change gear may be entirely abandoned, particularly on small cars. European, and especially British, manufacturers are more generally working toward this end than the makers in this country. The six-cylinder motor which has been brought out by several English makers is a step in this direction, the only direct advantages claimed for this form of motor being its excellent mechanical balance, constant application of power and flexibility. What will be the ultimate result of the development of the application to vehicles of the power of the hydro-carbon motor can, of course, be only conjectured, even if there is chance for conjecture. It is certain, however, that should it become possible to apply the power always direct, with one forward and one reverse mechanical application of it, a great step would have been taken toward motor car perfection.

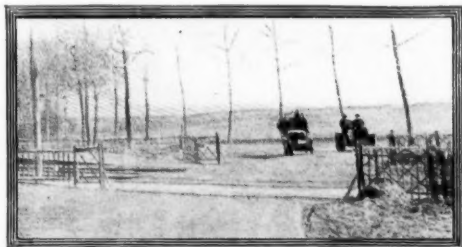
Automobile sport is not only for the rich. Special provision has been made by the German Automobile Club to make the Gordon Bennett cup race an especially attractive entertainment for the man who works for his money, and it has succeeded in securing a special hotel concession whereby rooms with single beds may be rented for the night for \$7.50 each. Breakfast, comprising fruit, coffee and rolls, is guaranteed to cost not more than \$4.50 and to be worth the money. Waiters will accept tips if sufficiently persuaded.

Automobile racing needs electric timing devices which are automatically operated by the passing of the car to be timed over the tapes marking the starting and finishing points. Motor cars are too fast to be timed by stop watches or even by electric machines depending partly upon the human element.

He is a man of iron will who can carry a \$1,000 roll of bills through an automobile show without buying a car.

CUP CONTEST

According to Roger Wallace and Julian Orde, members of the sports committee of the Automobile Club of Great Britain and Ireland, it is possible that the English trial race will not be run on the Belgian Circuit des Ardennes because the mayors of two villages located on the road have made such unreasonable financial demands for the use of the road passing through their villages. "The burgomasters have realized the importance of the race, and are under the belief that all motorists are millionaires, or at least have wealth beyond the range of ordinary mortals," said Julian Orde, "and the terms upon which the roads can be obtained for the day of the proposed race are somewhat beyond what we had expected." The sanction of the Belgian government would also have to be obtained, but this is generally believed to be an easy matter, on account of the well known enthusiasm of King Leopold for everything concerning automobile matters. Concerning the hotel charges, Mr. Orde said: "They are very high, but it must not be forgotten that Homburg is a good center for all countries, and that it attracts, every year, visitors from all parts of Europe, whether there is to be a motor car race or not." Mr. Wallace stated that the Automobile Club of Great Britain and Ireland had secured the use of 100 of the best rooms in Homburg at a reduction of 20 per cent on the charges fixed by the hotel



OVER A RAILWAY CROSSING

MOTOR AGE

Mr. Kimball, of the Central Automobile Co., says the first of the Napiers to reach this country will be those intended for the Boston show. They are to be shipped on the Ivernia, due at Boston March 10.

Eddie Bald has entered the employ of the Electric Vehicle Co. and has gone to Hartford to study the machines. This gives rise to the guess predicted on his engagement and President Budlong's known predilection toward racing as an advertisement that the Electric Vehicle Co. has in mind the building of a car for racing and record breaking and that Eddie Bald will be its driver. Bald is said to have confirmed this story.

Manager Davis, of the Knox Automobile Co., reports many inquiries for delivery wagons.

"The Martinis," says Alexander Fischer, "possess the chief features which have made the Rochet-Schneiders popular. Among the added features, however, will be Mercedes bearings and a new carbureter. I shall import the 20-horsepower model only. Its price will be \$7,500. I expect the first Martini here within a week."

Joseph L. Carrollo, proprietor of Lakeside park on Onondaga lake, has filed a claim for \$152.65 against the city of Syracuse on account of damages alleged to have been done his automobile, which was partly wrecked by running into a hole in the East Water street pavement on November 13.



MOTOR AGE

ON THE FRENCH ARDENNES CIRCUIT

syndicate. While Mr. Orde did not give out the amount the Belgian mayors asked, it is stated that each desires \$2,000. Besides, the Belgian authorities are reported to have stipulated that they will require a fee of \$1,250 for each car that would compete in the race.

The French elimination trial race will not be run over the circuit de l'Argonne, but over the French circuit des Ardennes. The road will be about 77½ miles long, and will have to be covered at least four times. The start will be at Rethel and the following villages will be traversed by the contestants: Sault-les-Rethel, Biermes, Menil-Annelles, Pauvres, Boureq, Vouziers, Ballay, Quatre-Champs, Le Chene, Tannay, Chemery, Chehery, Donchery, Dom-le-Menil, Flize, Boulzicourt, Poix, Cretes de Poix, Neuville-aux-Tourneurs, Cretes de Neuvisy, Faissault, Saules-Monclin and Novy, with the finish at Rethel. Rene de Knyff, who went over the road as a commissioner for the sports committee of the Automobile Club of France, said: "There are much better roads in France, but it is perfect because it comes very

METROPOLITAN GARAGE GOSSIP

Hollender & Tangeman have ordered a F. I. A. T. racing car for the track circuit. It may arrive in time for competition at the Virginia Beach meet in May. It will be of 60 horsepower and of the pattern the Italian team will drive in the international cup race.

Elliott Mason, of the Pope Mfg. Co.'s downtown store, is expecting the first of the Pope-Tribune runabouts March 15.

Alexander Fischer has taken the exclusive agency for this country of the Martini cars. These are built by the well-known rifle manufacturing firm at Geneva, Switzerland, under a Rochet-Schneider license.

Horace B. Day, formerly of the Cadillac Co., of New York, has taken the agency for the Queen and also for the Wolverine—Detroit-made cars. He has opened a spacious and well appointed two-story garage, occupying the entire building at 60 West Forty-third street. A Queen demonstrating car is already at hand and the Wolverine one is expected March 1.



MOTOR AGE

ONE OF THE FAST STRETCHES

TRIAL EVENTS

near to the German road, where the final battle of superiority will be fought. I believe such a road is wanted and if some wished for an easy course they are under a wrong impression as to the object in view. In a general way the circuit des Ardennes is striking similar to the Taunus road and has about as many dangerous stretches, sharp curves and beautiful long pieces of level road, very wide in some parts and narrow in others. As to speed possibilities, I think this road offers the same advantages as any other, and it will be up to the ability, nerve, and care of the driver to get the best out of his car."

According to the present plans the start of the Gordon Bennett race will be made at 7 o'clock in the morning. Figuring upon possible delays and bad weather conditions during the early hours, the race may not be ended before 4 or 5 o'clock in the afternoon. It is figured that at least 70 minutes of neutralization will be imposed on each circuit, and as there will be four, this represents 4 hours 40 minutes, which will not be taken in account in the race. It is estimated that an average of 100 kilometers will be reached over the proper racing ground, which means that each circuit would be possibly covered in 75 minutes or 5 hours of actual racing to cover the 310 miles of the entire course. Such speculations are now a fad in continental Europe.



MOTOR AGE TYPICAL STRETCH OF ARDENNES CIRCUIT

The Richmond Automobile Co. has taken the Elmore agency and opened a fine garage at 62 West Forty-third street.

F. A. La Roche has cabled for one of the Darracq cup candidates to be sent over here in May for track racing. He will retain the Blue Streak he used last year, and also import a car for the lightweight class contests.

The West Forty-third street retail district is growing. It now embraces the Sidney B. Bowman Automobile Co., Clement; the Richmond Automobile Co., Elmore; A. G. Spalding & Bros., Autocar; Horace B. Day, Queen and Wolverine, and the Pioneer Automobile and Campus Motor Co., Stevens-Duryea.

The Ansonia Motor Car Co., which deals exclusively in second hand machines, has two garages. Its main salesroom is at 1064 Broadway, near Sixty-sixth street. "There is a big demand for second hand cars," said Manager Townley, "but they must be in prime condition and of recent vintage. There are really not many of these to be had. Those having them and intending to buy this year's models are holding on to their old cars until warmer weather shall induce them to take out their new ones from the agents. We will then have a chance at them. We have already a long waiting list for cars of popular make. Few dealers have room to take old cars in exchange and so for the most part we get them direct from owners."



THE WINTON FACTORY
AT CLEVELAND, O.

IN the entire country there is no better single evidence of the tremendous evolution through which the automobile business has passed in a few years than the factory and the business of the Winton Motor Carriage Co., of Cleveland, O. Six years ago saw Alexander Winton with a half-dozen assistants "building" automobiles in a shop occupying one room in a power building, where he rented space. Today finds Mr. Winton supervising the manufacture of automobiles in a plant that employs from 800 to 1,000 men. Other people were making automobiles 6 years ago, probably just as good automobiles as Alexander Winton's, but today in several cases their names are not to be found in the list of American automobile manufacturers.

Why the success of Winton and the failure of some of the others? A dozen reasons can be suggested—sufficient capital to carry on the work, liberal and intelligent advertising, the building of a practical car that gave comparatively little trouble, liberal treatment of customers, the building of record-breaking cars, attractiveness of design and finish; all these have truly been in Winton's favor, but 75 per cent of the reasons for Winton's success can be summed up in the one word, "system." And this has resulted in the ability to deliver cars when people wanted them; in cars that were mechanically accurate in every detail and did not develop crude spots due to careless construction; in cars whose every part could be replaced at a moment's notice from the factory, the customer having the assurance that the duplicate part he received would take the place of the old without alteration and delay.

Occasionally tradesmen have cast reflections upon the Winton because it did not contain this or that alleged improvement or this or that device which in many cases were merely experiments. Ask Mr. Winton about some of the quickly sprung innovations and he will doubtless admit that they may have their advantages, but, in turn, he will point to a car that is devoid of unnecessary parts, designed for simplicity of operation and maintenance, and above all a car that is interchangeable in every part. He will point to thousands of operators in all parts of the country, and he will cite instances without number of Winton operators who have used their cars week in and week out, in city service and on long country tours, with entire satisfaction. Such results never could have been obtained had the Winton people followed the practice of applying experimental improvements to every new machine as it was brought out. While of course they are continually carrying on experiments, the experimental department is conducted as a separate institution from the manufacturing end and the experiments leading to radical improvements in the car itself only became operative at the beginning of the season, when a new model is brought

out. In other words, the factory adopts a model after it has been thoroughly tried out and proven practical by the experimental department, and after all its machinery and forces have been organized for turning out that model, the work of producing a predetermined number of machines is carried out in a systematic manner. There is no such thing as "building" a Winton automobile as one considers building a boat or a house. Nine-tenths of the Winton factory is devoted to producing automobile parts. Each man and each machine produces a certain part. Gradually these parts work together to form a complete automobile, but it is not until the door of the shipping room is reached that the Winton automobile is finished.

The brains of a factory may be said to be the offices and the drafting room. The former provides the wherewithal, makes the sales, keeps the accounts, and is the helm by which the entire craft is steered. The drafting room evolves and presents the ideas which must be followed out to produce the desired article.

The Winton offices occupy the ground floor of a two-story structure in the center of the group of buildings, and which is really a part of the paint shop. Suffice to say that the offices are commodious and well arranged and that the same system which pervades in factory proper obtains in every part of the office force. The drafting room occupying the upper floor of the office building is airy and well lighted. An electric blue print machine assures systematic output regardless of weather conditions, and there are ample filing cases for convenient handling of drawings. A fire-proof vault insures against loss of valuable

drawings, which, as every manufacturer knows, cannot well be replaced.

The power house, the heart which supplies the mechanical energy for a plant, has been given full consideration by the Winton people. In the original plant it was the intention to operate all machinery by gas engines, but in designing the recent additions it was decided to abandon this method and install a steam and electrical plant of ample capacity, and of the most modern type, with the result that the Winton power house is undoubtedly one of the most efficient layouts to be found in a manufacturing establishment in this country. The boiler and engine rooms are really in separate buildings, the former being at one end of the building containing the foundry, sheet metal and blacksmith shop, while the engine room is in the building containing the experimental shop.

The feed water system has been worked out to a nicety and the amount of water required is remarkably small, resulting in a great saving in this usually expensive item. The initial supply is taken from the city mains and passed to a feed water heater and pumped from this to the boilers; twin pumps performing these operations being arranged so that each can pump either way, and in case one should break down the system could still be maintained by pumping cold water direct to the boilers. An additional boiler feed pump 14 by 10 by 12 inches is to be installed, which will still further improve the system. Steam passes from the boilers to the engines and the hot exhaust steam is then piped throughout the entire group of buildings for heating purposes, portions of it being used in the glue pots, enameling ovens and dryer ovens. The circulation of the steam throughout the buildings and the condensed water is returned to a cistern by means of a vacuum pump in the boiler room.

The equipment of the engine room includes two 200-horsepower Skinner automatic, high-speed, simple engines, and one 100-horsepower engine of the same type. The first two are directly connected to 100-kilowatt Western Electric direct current generators and the small engine is belted to two 33-kilowatt generators. The average load for the entire plant at present is about 225 kilowatts. There are ten



MOTOR AGE

ASSEMBLING DEPARTMENT OF CARPENTER SHOP

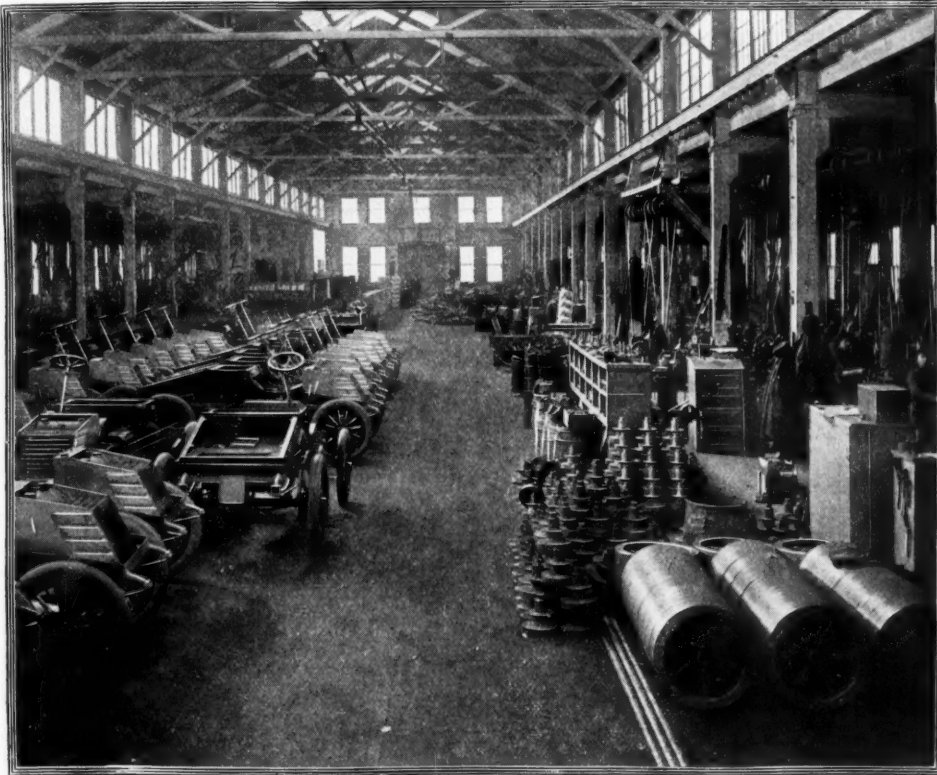
motors in various parts of the plant ranging from 25 to 50 horsepower, some of them 110-volt and others 220-volt machines. Both arc and incandescent lights are used in illuminating the plant, double rows of arc lights being used in the larger buildings. The various circuits are controlled from a seven-panel white marble switchboard built by the Western Electric Co. The three wire system is used throughout.

The use of high speed steel for cutting-tools has become almost universal in this plant. This is one of the latest developments for labor saving machinery. Several makes of this steel have been tested and the Styrian steel has been found most satisfactory. Cutting tools from this not only admits of high speed, but the tools remain sharp longer than others. An outline of some of the machine tools in

cylinder surfaces; it planes from two to eleven cylinders at once, according to the surface to be planed. A Lucas Machine Tool Co.'s precision boring mill is used in boring and facing bushings for the speed change box. This must be accurate work, since the meshing of the gears depends upon the accuracy of the bushings. The bushings are sweated together and a special chuck holds them in position while one side is bored and faced. Without changing the hold or position the chuck is reversed and the piece bored and faced from the other end, thus insuring uniformity of both ends.

A Rivett-Dock thread-cutting tool is used in threading inlet valves. This is a circular cutter having ten teeth, each differing slightly from the next. Ten cuts are required to cut the thread. It could be done in one-twentieth the time on an automatic screw machine, but the thread must be exactly true or the valve will not seat perfectly; hence the slower and more expensive operation. A Little Giant key seater is used in key seating crank shafts. Key seating for rear axles is done, four at a time, on a No. 3 Brown & Sharpe miller, which is provided with a special fixture. Differential pinions are cut, eight at a time, on a Becker-Brainard, Lincoln miller. A boy operates this tool and produces ninety in 10 hours.

Seven Nos. 3 and 4 Brown & Sharpe universal gear cutting machines turn out thousands of gears at the rate of from three to ten at a time, according to stock, teeth and pitch. Six Dressus-Mullen Co.'s radial drills are used in boring slow friction plates. These are produced on automatics and then placed in the radials to get an exact standard. Three No. 5 and one No. 6 Becker-Brainard vertical millers are used in surfacing cylinders and in other heavy surface work; these tools are said



MOTOR AGE

GENERAL VIEW OF THE MACHINE SHOP

Adjoining the boiler room is the gas house. By spraying gasoline through heated air gas is produced. This is contained in a number of large tanks in the gas house and is pumped from these to the retorts in the foundry. Gas is also used for heating the annealing ovens and forges in the forge shop.

The various buildings of the plant are so arranged that raw materials are received at the center of the plant and are distributed in the course of manufacture in opposite directions. Gradually they assume shape, and when they have worked their way back to a central point again they are finished automobiles ready for shipment. Every operation is orderly.

Directly opposite the point of reception is the machine shop. This has an open center span with wings, and the total area is 30,000 square feet. Both the wings and portions of the center are filled with machine tools. In no other portion of the plant is it so easy to discern the secrets of the Winton success in producing a large output of high class interchangeable parts. Every tool in the house is of the most modern style. Wherever it has been found possible to secure a tool that would reduce the cost and increase the possibilities for turning out a certain piece, that tool has been purchased. As much of the machinery as possible is automatic, which accounts for the fact that with only about 200 men in the machine shop and with about 800 in the entire plant they are producing at the present eight large touring cars per day. It is obvious that 100 men with ordinary machinery could not produce one car per day from the ground up. Automatic and labor saving tools, combined with system, could only make it possible.



MOTOR AGE

ONE SIDE OF THE MACHINE SHOP

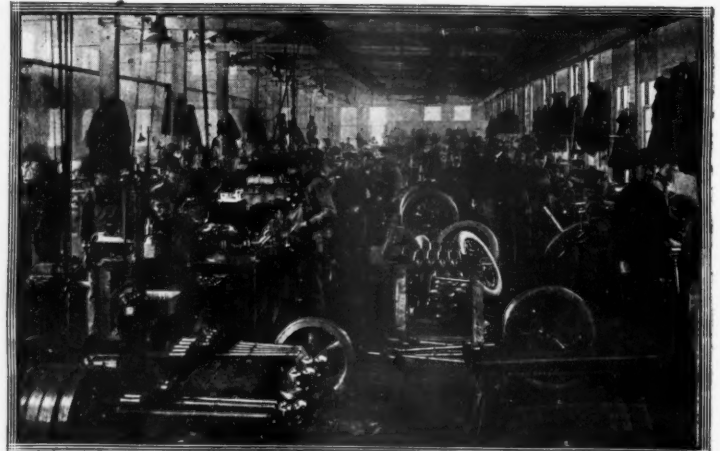
this shop will be interesting to those familiar with machinery. Three No. 3 Cincinnati gang milling machines are used on aluminum parts and drop forged connecting rods; these mill two surfaces at once. Eight No. 3 Brown & Sharpe milling machines are used on steel parts. A Gray 40-inch planer, 36 inches between housings and of 14-foot bed, is used in planing

to be much faster and more accurate than planers for such work.

In boring cylinders there are two operations. The rough work is first done on a Niles Tool Works Co.'s horizontal boring mill. They are then placed in a Binnse Machine Co.'s horizontal boring mill, which is fitted with a special jig and support, by the use of which



FRAME-MAKING DEPARTMENT



ASSEMBLING COMPONENT PARTS

extreme accuracy is obtained. With this the cylinders are ground to gauge to $\frac{1}{4}$ of 1-1,000 of an inch. With the two tools the workmen rough and finish twenty-two cylinders per hour. Between the two operations the cylinders are submitted to a severe hydraulic test, which develops any flaws in the metal. If a cylinder leaks it is thrown into the scrap pile, no attempt being made to patch the flaws.

Two Prentiss Machine Tool Co.'s radial drills are fitted with special jigs and are used in drilling piston rings. In addition to these drills there are four 26-inch Aurora Tool Works vertical drill presses and a number of small post drills furnished by Strong-Carlisle & Hammond Co., of Cleveland.

A heavy four-spindle drill press with 4-inch head, built by Foote-Burt & Co., is used in drilling connecting rods and front axles, and the same company furnished one three-spindle and one four-spindle lighter machines. These tools work on three or four pieces at once. Twenty-five Bardens & Oliver screw machines make a multitude of small parts which many manufacturers purchase from specialists. The Winton people use so many of these parts that they find it preferable to make them themselves, insuring accuracy and good stock and saving the manufacturer's profit. Among these parts are cap screws, studs, spark plug parts, etc.

There are also several National Acme automatics, which do four distinct operations at a time. These machines are turning out 7,000 differential pinions, six being used on a car; 2,000 inlet pistons, 9,000 adjusting set screws for clutches, 90,000 radiator nipples; eighty being used on a cooler; and 10,000 spark plugs. Packing glands are produced at the rate of 2,500 in 10 hours.

A Brown & Sharpe automatic turns out thousands of spindles for roller bearings. A Cleveland automatic turns cones for the front hubs. These are made from Sanderson tool steel and are tempered in oil and then ground.

A Lodge & Shipley screw machine works on piston rings. This is provided with special tools by which the outer surface is turned and the inner surface bored in the same operation. A Jones & Lamson flat turret lathe turns cam shafts; this is a high speed tool, turning 118 feet per minute with a 3-64-inch feed, using high speed steel.

In boring phosphor bronze pit bushing a special jig is used, by which both sides may be bored without removing from the fixture. This is similar to the one previously mentioned. A Bement-Niles vertical splining machine is used in key seating the crank shafts. All crank shafts, inlet and exhaust valves, inlet pistons, cam shafts, wrist pins, etc., are fin-

ished on Landis grinders, of which there are two No. 11 and one No. 4 models. These have carbondum wheels which revolve at 5,000 feet per minute. A Cleveland Automatic Machine Co.'s worm milling machine turns the worm steering gears, while a Grant Tool Works' worm hobbing machine, fitted with automatic stop and reverse, does the hobbing for the piece which meshes into the worm gears.

In addition to the above tools there are thirty lathes of Davis, Prentiss, Lodge & Shipley, Bradford, Le Blonde and American High Speed makes, ranging from 12 to 36-inch; fifteen small Prentiss 20-inch presses; four Smith & Mills 20-inch shapers; six Bar & Co.'s sensitive drill presses; two Cady Machine Co.'s presses and one E. W. Bliss punch press. On the Cady presses are produced 30,000 radiator fins in 10 hours. These tools are all in the machine shop proper and are arranged along the sides. A single 300-foot line shaft runs the entire length of the shop on each side, each shaft being turned by two 50-horsepower motors, one at each end.

Partitioned off at one side is the tool room, which contains the following tools: Two Greenfield universal cutter grinders, one No. 2 Brown & Sharpe universal grinder, one Becker-Brainard universal miller, two Pratt & Whitney 14-inch tool lathes, one Flather lathe, two Prentiss lathes, two Lodge & Shipley lathes, two Brown & Sharpe universal lathes, three Whitney millers and one Gishholdt lathe. In the center is the stock room for tools and adjoining this is the stock room for small finished parts.

In one corner of the machine shop is the tire room and wheel assembling room. An immense stock of tires is kept on hand. In this room also the spark plugs are assembled. Platinum tips, worth their weight in gold, are soldered in and then each plug is tested, under conditions the same as are found in a standard car. Adjoining the main door of the machine



MOTOR AGE

THE TESTING BRAKES

shop is the private office of Edward O'Hagan, foreman of the department. Under him is a staff of inspectors who inspect every part produced. In another corner is a stock room for raw material used in the machine shop. The material is in racks or bins, each properly tagged.

The tin shop and sheet metal department are in a room 125 by 80 feet adjoining the boiler room. The work in this shop is largely bench work. Sheets of copper and tin are cut and formed into proper shapes and soldered into tanks and other parts. Copper pipe is cut into correct lengths and formed into the shapes required for the various lubricating lines. The construction of the radiators is an interesting process. There are forty tubes in each radiator, with sixty-five flanges on each tube. Small boys slip the flanges onto the tubes and screw in the brass nipples. A fireproof wing at one side of the room contains a dip soldering outfit and a man is kept constantly busy dipping the flanged tubes, which are brought in on racks. Two large gas brazing outfits are used in brazing rear axles and differentials and the supports for canopy tops. The filing of these parts is also done in this room. One corner of the room is partitioned off for a polishing room. This is well lighted and well arranged. The dust from the polishing machinery is carried off by a ventilating system. In this room are also tumblers for finishing numerous small parts.

The blacksmith shop and foundry occupy the remainder of the large building, which is practically the same size as the machine shop and parallel with it. In one end of this room there are seven blacksmith's forges and here numerous small parts are forged and welded by hand. A Brown & Sharpe forging outfit, using gas as fuel, is utilized in welding front axles and steering gear parts. The heat in this forge is terrific and it admits of much faster work than forges using coke as fuel. Adjoining the forge is a Bement-Niles steam hammer, supported on a concrete foundation. It strikes a blow of 800 pounds and is used in forging heavier parts.

A large force is employed in the core making room, as the Winton company makes practically all its own brass, aluminum and iron castings. At one side of the room are gas heated ovens for hardening the cores after they are formed by machinery and hand. The parts are wheeled into the ovens on racks so that little handling is required. Adjoining the oven on one side is an annealing and case hardening furnace, also operated by gas. On the other side of the oven is a row of twenty retorts for melting brass, aluminum, iron and other ma-

terials for castings. These are operated by gas under high pressure.

The assembling shop is 200 by 125 feet, at right angles with the machine shop and the forge, foundry and tin departments, so that parts may be taken directly to this department without having to pass through others. Around the sides of this room are numerous benches, where a large number of men are employed in assembling carbureters, transmissions, hubs and other parts which go into the car as complete units. These parts, after being assembled, are taken back to the stock room in the center of the machine shop. The men doing this work are termed the feeders and in reality they are not a part of the general assembling scheme. The cylinders are brought into the assembling room in two sections. These are bolted together and then the valve seats are ground to accurately fit the valves. The gears are fitted in and then the circulating pump and oil pumps are put in place.

The cylinders are then hung in the frame. In drilling the holes for hanging the cylinders an electric drill is used. This is on wheels and is provided with flexible connections and flexible transmission, so that it may be used over a considerable radius. After the frame has been hung the muffler, cooler and lower water connections are installed. Up to this point the work has been done by different individuals, each performing a certain operation. It is here that the men known as assemblers start their work. Two men assemble each car. They are given a written order on the stock room for a complete set of parts for assembling one car, and they are in charge of a certain car until it has been given its preliminary testing out. After all the parts have been put into place the machine is started to see that it will run. The time required for assembling the car up to this point by the two men is about 15 to 18 hours. The assemblers work entirely independent of other crews performing the same work, so that the chassis are completed at different times and a constant stream of machines is being finished for the testing process.

The completed chassis is hoisted by an electric traveling crane which covers the entire building and is placed on a testing truck. By means of this truck the chassis is carried to a testing brake and coupled to the latter by the chain to be used on the car. The brake consists of a large disk with a friction band, which is controlled by a screw and wheel and with a scale balance, designating the power exerted by the machine. The test not only gives the maximum developed horsepower, but



MOTOR AGE

THE FOUNDRY

the actual horsepower under conditions similar to those encountered on the road. Each machine is run under a heavy load for 6 hours; 3 hours on high speed, 1½ hours on low speed and the same time on reverse. The machine is then carefully inspected and if all right is sent to the running gear department, where wheels, axles and steering gear are fitted. This work is done over pits. A temporary body is fitted and the car is then given a 15-mile run on the ¾-mile board track which surrounds the plant. After being given this test, wheels and running gear are carefully wiped off and the body in a partially finished condition is installed.

The arrangement and equipment of the assembling room have been carefully planned. There is little or no confusion because the men remain in the same place practically all the time. Certain men are employed in moving the various parts and complete machines, and it is done in an orderly manner. In addition to the electric crane, previously mentioned, there is an overhead carrier system for handling heavy parts, as well as a portable crane on a truck, used in assembling cylinders. About 215 men are employed in the assembling room and eight cars per day are now being assembled. The department is in charge of M. F. Hayes.

For convenience the frame-building department occupies one end of the assembling room, and in reality is a part of the assembling department. The Winton frame is all steel and the sheets and angle bars are delivered in the required length and size. Riveting holes are made by drill press or by cold punch, according to size, and riveting is done in presses.

A splendid large building is devoted to the wood working department, where car bodies and other wood parts are made. This building is located at the extreme north end of the plant, measures 200 by 168 feet, and has a

center span 200 by 80 feet, unobstructed by supports. The center is devoted to the assembling of bodies, while the machinery is located in the wings. The wings are two stories high, the balconies being used for the storage of lumber. The company uses great care in the selection of lumber and it buys only well seasoned ash and poplar. The lumber now being used was purchased early last summer and has been in lofts since that time. If lumber is slightly damp when received, or if certain planks do not seem to be thoroughly seasoned, they are placed in large steam heated drying kilns, located at one end of the building, and allowed to remain there until thoroughly dried.

The machinery equipment includes planers, shapers, boring machines and mortisers. A prominent feature is that all sawdust and shavings from machinery as well as hand work are carried out of the building by a system of blowers, connected with every piece of machinery, also having openings in a number of places where shavings may be swept. The air in the building is devoid of the dust usually found in such a plant. The line shaft in the building is driven by a 30-horsepower motor, while a 25-horsepower motor, suspended on a shelf, drives the blower system. The blower system terminates in a towerlike building outside. Wagons drive underneath and shavings or sawdust are fed into them by gravity.

All the work is laid out with patterns, and pieces are cut out with band saws. The side of all bodies are one piece and each seat is one piece of veneered wood. At one side is a glue and press room, partitioned off. This is provided with presses for veneering and holding glued pieces, and in the center of the room are the glue pots, which are heated by steam from the main steam line. J. P. Burkholder is foreman of this department, which employs 140 men.

From the wood working shop the body goes to the paint shop, where it meets the assembled chassis. The paint shop is a building 300 feet long and has the office building in one corner of it. It embraces 40,000 square feet of floor space and is divided into several departments. From twenty-four to twenty-six operations are required to paint and finish a Winton car body and from fifteen to seventeen coats, according to color, are used. This year the Winton company is furnishing three standard colors: the Winton maroon, a Brewster green and a canary yellow, the lighter color requiring two more coats than the others.

After the car has been divested of the testing seat the chassis is painted with aluminum bronze, with maroon striping. The frame is



MACHINE DEPARTMENT OF CARPENTER SHOP



GENERAL VIEW OF CARPENTER SHOP



MOTOR AGE

THE REPOSITORY

then enameled black, striped and decorated. The upper body is then placed on the car.

The body, after coming from the wood working department, is given a priming coat and then a coat of lead. It is glazed with putty and then given a coat of flat lead. After that it is given six coats of "rough stuff," or body filler, and is then ready for the guide coat. The body is then rubbed with lump pumice and given three coats of color. Next come three coats of rubbing varnish, each being rubbed with pulverized pumice stone. It is then rubbed to a smooth finish, after which it is given a

200 by 50 feet, which is combined with the shipping department. The trimming section is divided into two rooms, one containing the cutting and sewing departments and the other the leather and upholstering departments. Enameled trimming leather is used and this is delivered in large rolls. It is cut according to patterns and goes to the sewing room to be stitched. Here are employed about a dozen girls, the only women in the entire plant, not even excluding the office, where no women are employed. The various stitching machines are operated by individual motors, the girl simply turning a switch in handling the machine.

In the leather room are leather creasing machines and seiving machines for insuring even thickness of the leather. After leaving the sewing room the pieces go to the bench hands, who upholster the backs and cushion tops, using long white hair drawings. Then the seat workers complete the job.

After being upholstered the bodies are returned to the paint shop for the final finishing coats, after which the complete car is returned to the finishing room to be fitted with the canopy top, aprons, hoods, etc.

Then the car goes into the shipping room, and even here work has to be done before the car is ready for the purchaser. Lamps and

or rebuilt without interfering in the slightest degree with factory production. The repair factory includes a machine shop, assembling department, wood working department, paint and varnish department, upholstery department and a stock room, which contains duplicate parts for every Winton model, from the earliest model to the 1904 touring car.

In the building containing the engine room is the experimental shop, also a comparatively complete factory in itself. Few outside those actually employed in this shop have ever seen the inside of it. While the shop is devoted largely to developing new models, racing cars in particular, being the home of the two latest Bullets, it is also a testing department, where all materials entering into the construction of the car are tested before being accepted; as well as a department in which are designed many special devices and appliances that will tend to improve and simplify the processes employed in the various factory departments.

Mr. Winton supervises the work of the experimental department and spends a great deal of time there. L. Melanowski, mechanical engineer for the company, assists Mr. Winton in the experimental work and has under him a number of experts who are constantly at work developing new ideas. Mr. Winton also super-



CUTTING AND SEWING IN FINISHING DEPARTMENT



UPHOLSTERING—FINISHING DEPARTMENT

coat of finishing varnish. The wheels are given about the same treatment and are stripped in the last rubbing coat. When the body seat and tonneau are in the last coat of rubbing varnish the seat and tonneau go to the trimming department and the body to the assembling department, after which they are returned for the final rubbing and finishing varnish. Fenders are given about the same treatment as bodies and after each coat they are placed in racks which extend to the ceiling, each body taking 27 days to go through the painting and finishing process. One prominent element in the success of these operations is the dust-proof varnish rooms. One, 150 by 30 feet, is devoted to rough finishing, this department being provided with cement floor; while the finishing varnish room is 30 by 300 feet, covering one entire side of the building.

The canopy top stanchions, springs and various other iron parts are treated to several coats of enamel, each coat being baked on. Three large gas heated enameling ovens occupy a space between two of the departments. Before being enameled the springs, which are among the very few articles not manufactured by the company in its own shop, are treated to a hot lye bath, in order to remove a coating of rust preventative. The paint shop employs 150 men, in charge of Fred H. Kroeger.

The trimming department occupies a building

horns are fitted and then removed. The canopy top is taken off and the entire machine covered with muslin; if for foreign shipment it is securely boxed. The shipping room floor is practically level with the freight car floor; a switch from the main line of the Lake Shore & Michigan Southern railway. Three machines are usually shipped in a freight car. The wheels are blocked by pieces of wood 3 by 8 inches; cut on a bevel, and on each side of each wheel is placed a strip 3 feet long and 1 foot high. In this way the machine is securely blocked against any possible movement in transit. The lamps, horns, etc., are boxed and the canopy top is placed at the side of the machine and securely fastened to the car wall.

At the extreme south end of the plant is a building 200 by 125 feet, which is practically a complete automobile factory in itself. This is the repair department. A Winton car leaving the plant never sees it again. The various branch stores in the larger cities are equipped with repair shops, but if a car is so seriously damaged that it cannot be repaired at the branch, it is shipped to the Winton repair department. A large portion of the work carried on in this shop is in rebuilding cars for owners who desire the up-to-date improvements. The great advantage of such a shop is that any Winton car ever manufactured can be repaired

vises the work in all departments of the factory. Jacob F. Weidig, who has been with Mr. Winton almost since the first car was built, is superintendent. Thomas Henderson, vice-president of the company, exercises a general supervision over the purchase of machinery and supplies, and it is due largely to him that the equipment of the big plant is of such excellent quality. George H. Brown, secretary and treasurer, has practically the management of the business affairs of the company in his hands. This year he relinquishes all work in connection with sales to Charles B. Shanks, whose close attention to business has advanced him in a few years from a minor office position, first to the conduct of Winton advertising, then to the management of the Winton depot in Cleveland, and lately to his present office. Mr. Shanks retains his supervision over advertising, but has an efficient assistant in Charles W. Mears, formerly editor of *Cycling Gazette* and *Motor Review*, and who is now mainly responsible for *Auto Era*.



VIRGINIA'S FINE BEACH

Pronounced Better Than the Florida Course and Big Meet Is Looked for During Next May

New York, Feb. 21—Lee Straus, of the F. A. La Roche Co., who has returned from a visit of inspection to Virginia beach, in the interests of the race tournament to be given there by the Virginia East Coast Association, pronounces the beach undoubtedly available for automobile speeding, is sure a nearby rival to Ormond has been found and prophecies a great meet there next May. Mr. Straus pronounces the reports of the existence of gullies and soft spots to an extent to interfere with straightaway racing and time trials to be unfounded.

"We went over 20 miles of the beach in three automobiles—an Olds, a Cadillac and a Long Distance," said Mr. Straus, "and found it a magnificent stretch, undoubtedly fit for speeding. The wheels of our machines made no impression whatever in the sand. We saw the beach under very unfavorable conditions. The life saving people and the natives say it has been a winter of continuous storms, and so the beach is more 'wavy' than it is normally. The warm May sun will dry out and improve the course. There is some wreckage, which by a match and a little dynamite could be cleared at an expense not to exceed \$50. There is a good straightaway stretch of 80 miles from Virginia beach to Oregon inlet where available racing surface varies from 150 to 300 feet in width. The formation of the beach is favorable, for it is not at all slanting, as has been said, and no soft spots were found. The beach runs as straight as an arrow for over 90 miles. W. Erby Smith, superintendent of the government telegraph and telephone system, a man who has been for about 25 years active in government work from Cape Cod to the southernmost point of Florida, assures me that there is no point on the coast where as hard and as continuous a course as this may be found. Wires, which will be available for the timing apparatus, are already up.

"The Virginia East Coast Automobile Association has for its nucleus the Norfolk Automobile Club. Its membership is made up of automobilists from Norfolk, Portsmouth, Berkeley and other towns in the vicinity. Virginia beach is 16 miles south of Norfolk, and is connected with the latter by a fine shell road. A trolley line makes the run in 35 minutes."

It is proposed to have 5 days of racing, to be followed by an open-air show, utility tests and a floral fete. In other words, it is proposed to give southerners an all-round demonstration of the possibilities and the practicality of the automobile.

There is already talk of the elimination trials for the American team in the international cup race being run at Virginia beach, instead of Ormond, owing to the accessibility of the former and the likelihood of very hot weather at the latter course in April.

TRYING TO CLIMB MT. SNOWDON

A plucky attempt was made recently by Harvey du Cros, Jr., and Charles Sangster to climb Mount Snowdon in England. The height of Snowdon is 3,560 feet above the sea level and it is the highest mountain in England

and Wales. The climb was made January 27 with a 15-horsepower Ariel car. The only possible route was over the Snowdon mountain railroad, and even over this the difficulties were enormous. The last train was run over the road in October and the ballast had not been cared for since that time, so that the floods and rains had cut deep gaps in many places. The car had to be lifted over several of these.

Because of the unusual bad weather the attempt covered 2 days. The first day took the car to Halfway Station, midway between the base and summit of the mountain, and Clogwyn, the last station from the top, was passed on the second day. Beyond Clogwyn a gang of men was employed to remove the snow, but at the last ridge a block of frozen snow which had drifted to a depth of about



MOTOR AGE

CLIMBING SNOWDON

10 feet effectually prevented further progress. After a height of 800 feet was reached the dense fog prevented the explorers from seeing the top of the mountain. At times the wheels were within a few inches of a sheer drop on both sides of several hundred feet. Great difficulty was experienced in making the driving wheels act on the steep incline because of the flat, slaty composition of the ballast, which was scattered in all directions as soon as power was applied to the wheels. This handicap was partly overcome by winding chains around the wheels.

The average grade was about 16 per cent, and the loose ballast made this much more difficult to overcome. Another attempt will be made to climb the mountain as soon as the weather becomes more favorable.



MOTOR AGE

THE END OF THE CLIMB

TO HAVE COUNTRY CLUB

Members of the A. C. A. Plan Modern Establishment Well Out On Some Long Island Road

New York, Feb. 21—The project of the establishment of a country club by way of an objective point for short rides from the city is being agitated by the A. C. A. and meets with an enthusiastic reception. Already a committee consisting of T. M. Hilliard, Emerson Brooks and Homer W. Hedge has been appointed and is sounding the members informally on the suggestion. A circular letter is to be sent the members this week asking for their views in the project and as to their preferences for a location for the house as among Long Island, Westchester and New Jersey.

The chairman of the committee, Mr. Hilliard, says of the fifty members interviewed forty expressed a preference for Long Island; that Westchester came next in favor and that few favored New Jersey owing to its convenience of access. The argument in favor of Long Island was that it was easily reached by the Astoria or Long Island ferry without a long ride through city highways. Besides, many of the members belong to the Long Island fashionable colony and occupy their country residences a great portion of the year.

The present idea is not to establish an extensive club house with vast and costly surroundings, but rather to secure a comfortable farm house, which may be made the objective point of a ride and where a member may have a smoke, a drink and a bite to eat before his return journey. It may be possible to lay out a golf course and tennis courts. If a water front can be secured so much the better. If not, it is said that probably boat house and dock privileges can be obtained for the convenience of members owning motor boats, twelve of which are reported to have been already ordered by members.

The question of expense, however, will not stand seriously in the way if assurance be received of a general demand for a country club and its extensive use by the members. The surplus in the club's treasury from its initiation fees and dues has been largely increased by the club's share of the Madison Square garden profits.

Already there is talk of an amendment to the by-laws providing for a larger membership, the present limit of 400 having been reached and there being even thus early since its expiration a waiting list of twenty-one.

G. O. Shields, president of the League of American Sportsmen, gave a lecture at the club on Tuesday evening on "Timber That Grows at Timber Line."

BIG TOUR TO ST. LOUIS

New York, Feb. 21—President Whipple and other officials of the A. C. A. have returned from the Chicago convention and have begun work along the new lines of endeavor there determined upon—a great converging tour to the St. Louis exposition, the establishment of reciprocal privileges among members of A. A. A. clubs and the formation of a bureau of information as to competent chauffeurs.

The board of directors will meet in this city in March. At this meeting the personnel of the racing board will be announced. A meeting of the racing board will follow shortly.

HUB HUSTLERS ARE HAPPY

Boston Agents and Managers Celebrate Washington's Birthday with a Grand Spring Opening—Old Bicycle Custom Is Revived with a Profusion of Flowers and Geniality

Boston, Feb. 22—The majority of the automobile dealers of this city are today, the natal day of the father of his country, holding open house and entertaining the hundreds who are in search of information as to the latest things in automobile construction. The idea is one appropriated from the day when bicycling was in its glory, and custom decreed that every local cyclist of note should make a pilgrimage up the avenue. There is one great exception in the custom, however, and that is that the automobile dealers are not today appealing to the friendship of their visitors through the presentation of cigars and other souvenirs. They consider the automobile business above that standard and are talking good sound business.

At the Winton garage on Stanhope and Berkeley streets Harry Fosdick entertained his visitors in his usual hospitable manner. Although Mr. Fosdick has increased the storage capacity of his garage he is still in need of additional room, and possibly he will hereafter be forced to protect his own interests by declining to look after cars other than those made by the Winton company. The garage is unquestionably one of the best to be found east of New York city and its shops and offices are finished in an up-to-date manner.

The long line of Pope products was displayed by W. E. Eldridge at his establishment on Columbus avenue, and here one gained some idea of the vast interests of the Papes in the automobile line. The Pope-Toledo, Pope-Waverley, Pope-Hartford, Pope-Tribune, the Cadillac and the Pope line of bicycles were all displayed in an attractive manner. The Pope company is still looking for a garage suitable to its uses, and although it now possesses one such as would be considered ample for many it is not equal to the task of caring for the storage business of this concern.

Alvan T. Fuller displayed a line of North-erns and Orions at his Columbus avenue sales-room, but he greatly regretted his inability to show his latest car, the Packard. Mr. Fuller had anticipated receiving his Packard stock car, but it is still lacking, much to the regret of himself and Mr. Ross.

Fred Randall was proud in the possession of his Stevens-Duryea, the Clement and the Indian motor cycle, which made a formidable trio, which attracted no end of attention.

Ben Smith, with his long line of Oldsmobiles, was equal to the occasion, and during the day he, too, entertained his share of visitors.

The Reed-Underhill Co., with its recently remodeled establishment on Stanhope street, dwelt upon the fine qualities of the "waterless" Knox, displaying the latest models, and also a delivery car which has done good work in driving through the heavy snows of this winter.

The Lewis & Mathews Co. made a feature of the Decauville car, for which it is New England agent, while next door to it the Electric Vehicle Co. had a fine collection of electrics, as well as models of its Columbia gasoline cars. Kenneth Skinner was also ready to do business either in the de Dion or

the Boyer car, with both of which he is meeting with considerable success.

Coming back to the avenue one found Mr. Gilmore of the Rambler doing considerable missionary work, and displaying a long and varied line of the cars which made an enviable record on the trip to Pittsburg last year. The remodeled Grout steamer was displayed at the Boston office of the Grout Co., while next door was to be found the new Cameron car displayed by A. E. Coburn & Co.

Mr. Morrison, of the Peerless Co., did not keep open house, he contending that his men were entitled to all the pleasure to be derived from a holiday.

Several new steamers were displayed by George H. Lowe at the headquarters of the White company on Tremont street, while across the road on Berkeley street, J. H. MacAlman held forth in all his glory surrounded by friends and visitors who came to inspect the steamers and gasoline cars turned out by the Locomobile company.

Manager Henshaw, of the New England branch of the E. R. Thomas Motor Co., has been doing extensive missionary work with the new Thomas "flyer" demonstrating car. Hard winter runs have been negotiated practically every day and Mr. Henshaw is jubilant over the prospects of the new three-cylinder car.

H. H. Buffum & Co. have secured a sales-room on Boylston street in close proximity to the Massachusetts Automobile Club house, where they are to display both their automobiles and their motor boats.

During his recent trip to the Chicago and Detroit automobile shows Manager Campbell, of the Boston exhibit which is to be held in Symphony Hall the week commencing March 14, was surprised at the great interest displayed in this latter show. Mr. Campbell was informed by many western manufacturers that they personally will be at the show during the week. He was the recipient of several applications for space, which, even with the additional rooms secured in the motor boat show in Horticultural hall the same week, he was unable to accept, as every inch of the space in both halls has been disposed of.

The show committee is now endeavoring to make arrangements with the passenger association whereby excursions can be run from the larger cities of New England to Boston during the week of the exhibit, which plan, if perfected, will bring many out-of-town automobilists to the show.

In the motor boat exhibit in Horticultural hall will be found some of the leading motor boats in this country; boats made famous by their past and prospective victories, two of them having been matched to race for \$1,000 a side on the Hudson river early in May, the F. I. A. T. and the Vingt-et-un.

MINNEAPOLIS DEALERS ORGANIZE

Minneapolis, Minn., Feb. 22—Minneapolis automobile dealers will start the season this year with a definite understanding as to trade conditions. A trade association has been formed

comprising every dealer in the city and several rules have been laid down which will be strictly adhered to. The dealers have fixed upon a standard rate for storage; have determined to accept no old machines as part payment on new cars; have settled upon discounts, and have determined to unite forces to secure a wider margin of profit from the manufacturers.

The association is known as the Twin City Automobile Dealers' Association, although as yet there are no St. Paul firms enrolled. The membership consists of the following: Hayes Automobile Co., Pence Automobile Co., A. C. Bennett, E. H. Moulton, Jr., Northwestern Motor Vehicle Co., Great Western Cycle Co., Winston & Walker, Dr. C. E. Dutton, A. F. Chase & Co., Strong Automobile Co., Walter G. Benz, J. L. Menard.

While the association was formed primarily to put the trade upon a firm basis and prevent any demoralization of rates or conditions, it will make itself felt during the season by its efforts to improve the existing conditions in the northwest. Good roads, legislation and race and exhibition meets will be dealt with by committees from the association.

The chauffeurs of Minneapolis have followed the tradesmen by organizing an association for their own benefit. The club is formed for the purpose of bettering the members along mechanical and technical lines, and it will affiliate at once with the American Motor League. The membership of the club will be limited to the professional chauffeurs of the city and an effort will be made to secure the assistance of the automobile club and the association of automobile dealers in working along lines for the benefit of the industry and the sport. The club will probably be known as the Minneapolis Motor Car Club.

WANT THE FEE CUT

St. Louis, Mo., Feb. 23—The members of the St. Louis Motor Cycle Club are making a strong protest against the ruling of License Commissioner P. J. Clifford that two-wheeled motor cycles shall pay as much license as four-wheeled automobiles. Attorney John C. Higdon, president of the club, is leading the fight. The annual tax on automobiles is \$10, and the motor cyclist is now compelled to pay the same amount. A bill was introduced in the house of delegates a month ago reducing the tax on motor cycles to \$2 a year, but so far there has been no action taken on it. In speaking of the matter, President Higdon said:

"It is not fair to charge as much license for a motor cycle as for an automobile. There is as much distinction as there is between a buggy or wagon and a bicycle. The motor cycle has but two wheels and takes up no more space than a common bicycle. In New York a license of but \$1 per year is charged. St. Louis riders are more liberal than the New Yorkers and have agreed to pay \$2. An ordinance to this effect is now pending in the house of delegates and it should receive the hearty support of all honest lawmakers."

SECOND COLONY POSSIBLE

Chicago, Feb. 24—The Orlando F. Weber Co. removed this week from 521 Wabash avenue to 390 Wabash avenue, next door to the Studebaker Bros. Mfg. Co. The new location has a frontage of 40 feet and will be flanked on each side by an automobile store, so that the nucleus of another automobile colony is formed. Several sales made by the Weber company since the show at the coliseum have

been to persons who viewed the exhibit there, and may be considered the fruits of the work done during the show week.

D. M. Lord, senior member of the firm of Lord & Thomas, advertising agents, retired from active business life last week. He will be succeeded in the presidency by Mr. Thomas, who will continue in the active management of the business, as he has done for several years past.

Edwin S. Day has been appointed by Judge Tuthill to take charge of the affairs of the Chicago Motor Vehicle Co. The appointment was secured by Jonathan P. Primley and Henry W. Hoyt, who allege that there is a scheme to divert the assets of the company from their proper channel. Primley and Hoyt declare that the Monarch Railway Co., capitalized at \$2,000,000 under the laws of Maine, was to be a means of defrauding them and other creditors of the company.

Charles H. Tucker, manager of the Chicago branch of the Winton Motor Carriage Co., has been in Cleveland the past week arranging for the spring campaign.

The Auto-Bi, manufactured by the E. R. Thomas Motor Co., will be sold in Chicago this year by C. A. Coey & Co., distributors of the Thomas car.

The Ralph Temple & Austrian Co., of Chicago, changed its name to the Ralph Temple Automobile Co. last week, as explained in MOTOR AGE a few weeks ago.

CAPITAL SHOW PROMISES WELL

Washington, D. C., Feb. 20—The Washington show, the fourth annual one of the Washington Automobile Dealers' Association, is just a month off, and the trade is getting everything in shape for the affair. The following firms have taken space to date: Pope Mfg. Co., Woods Motor Vehicle Co., F. A. La Roche & Co., Cook & Owesney, Automobile Storage & Repair Co., Charles E. Miller & Bro., Edison Automobile Station, Washington Electric Vehicle & Transportation Co., Saks & Co., National Electric Supply Co., Cadillac Automobile Co., A. L. Cline & Co., Knox Automobile Co., A. Ward Chamberlain, Rose Mfg. Co. and William Hjorth.

The past week marked the retirement of the Willard Automobile Station from the local field. The concern was incorporated about a year ago to do a general automobile business at the corner of Fourteenth and C streets. Several prominent business men were the incorporators and A. L. Kull was the manager. The concern was appointed agent for a number of cars and did a nice business for a time, but a slump came and it was finally decided to dissolve the corporation and give up the business. A. L. Kull has entered into partnership with W. Leslie Edison to conduct the Edison Automobile Station. Announcement has been made that they have secured the agency for the St. Louis, Ford and Royal Tourist cars and will make a bid for trade.

The statement in the last issue of MOTOR AGE to the effect that the Potomac Electric Power Co. had obtained a judgment against the Edison Automobile Station for \$63.54 was an error. The judgment in question was obtained against the Edison Automobile Co., which was recently merged into the District of Columbia Automobile Co.

The Central Automobile Co. has removed its garage from Sumner Court to 1126 Connecticut avenue, a large building formerly occupied by the Locomobile Co.

ILLINOIS WANTS ROADS

Chicago Automobile Club Names a Committee To Carry On the Work—License Matters

Chicago, Feb. 23—President John Farson, of the Chicago Automobile Club, has appointed Sidney S. Gorham, counsel for the club, as chairman of the good roads committee. This committee will at once take up the work of forwarding the good roads movement, and will make the influence of the club felt. A bill will be prepared and presented to the legislature in case any legislation is desired. When asked for an outline of the committee's plans Mr. Gorham said:

"The other members of the good roads committee have not been appointed. It is the purpose of the club to assist in securing better roads for Chicago and the state of Illinois and to co-operate with the American Automobile Association, the American Motor League and other organizations having as one of their objects the securing of better roads throughout the United States, in urging the passage of the Brownlow bill by congress, and the enactment in Illinois of such legislation as will best provide for the improvement of our roads. The bad condition of many of our streets in Chicago is due to the system now in force of paying the cost of street improvements by special assessment of contiguous property. This particular difficulty is not experienced in the building of country roads.

"We hope to make the Chicago Automobile Club a factor in the promotion of good roads, a subject which is now attracting attention all over the country. If the Brownlow bill is passed Illinois will be entitled to \$1,398,000 of a total appropriation of \$24,000,000 provided for in that bill.

"If any legislation is needed in Illinois in order to secure the benefit of our share of this appropriation I understand it will be the duty of our committee to draft a bill and present it to our state legislature. In that event the active support and co-operation of every member of the club is confidently depended upon.

"The good roads movement is a popular one and will doubtless be an element of no small importance in the coming state and national elections. We believe that as soon as the club has paved the way we will have the support not only of automobile owners but of the farmers and of every public spirited citizen. While our country is new, it is old enough to be ashamed of the condition of its roads and it is high time better roads were built."

The city of Chicago has filed a petition for a rehearing in the Banker case, which was recently decided adversely to it in the Appellate court. The city, in seeking to uphold its right to license and examine automobile operators, asks the court to take notice of the facts that an automobile is a dangerous machine and that public safety requires that the machines be operated by competent persons. Corporation Counsel Tolman in the petition says: "A safe automobile becomes an engine of tremendous danger in the hands of an incompetent operator. The character of the machine therefore is of no greater importance than the character of the man behind the lever, and the right to determine the fitness of the one implies the right to determine also the fitness of the other. The court surely will not hold that a person

deficient in vision or hearing or with no knowledge of the powerful mechanical appliance entrusted to his care would be a proper person to operate a 60-horsepower automobile in the crowded streets of Chicago."

An injunction has been issued by Judge Honore restraining the city from enforcing the ordinance requiring that automobiles be numbered, that operators wear badges and that operators be licensed. The action was brought by the Woods Motor Vehicle Co.

The directors of the Chicago Automobile Club have changed their regular meeting day from Tuesday to Thursday of each week. The membership of the club is growing rapidly, and over two dozen applications are now on file to be acted upon at the next meeting. The coliseum show was a great impetus to the club, and much of the increased interest is attributed to the enthusiasm stirred up during the week of the show. The prophecy of President Farson that the club would have a membership of 500 before the year is over seems probable now of fulfillment. Frank X. Mudd will represent the club at the elimination trials of the American team which will be entered in the Gordon Bennett race. These trials will be held on the Virginia coast about Easter week.

COMMERCIAL TESTS ARRANGED

New York, Feb. 21—There is little to add to the details of the proposed commercial vehicle service test to be promoted by the A. C. A. during the 6 days of April 4 to 9 in this city, which were set forth in the telegraphic dispatch published in MOTOR AGE this week. The official announcement of the list and its conditions follow:

The test will be open to motor wagons used for commercial purpose made in the United States or abroad. The classification will be on the basis of dead load carried, all wagons of like weight, whether steam, gasoline, or electric, to operate in the same class. The following classes have been established:

- 1—To carry a dead load of 1,000 pounds or under.
- 2—To carry a dead load of 1,000 to 2,000 pounds.
- 3—To carry a dead load of 2,000 to 3,000 pounds.
- 4—To carry a dead load of 3,000 to 4,000 pounds.
- 5—To carry a dead load of 4,000 to 5,000 pounds.
- 6—To carry a dead load of 5,000 to 6,000 pounds.

With a view of holding a more thorough and practical test than has heretofore been afforded, the wagons will be placed under actual working conditions in the service of the American Express Co. and the Westcott Express Co. for one week from April 4 to 9 inclusive, and will transfer and deliver merchandise, produce, baggage, etc., from the various depots of these companies during the entire week.

Awards will be made in each class for the best performance, based on the economy of operation in time and fuel, ratio of paying load, ton mileage, and general reliability and availability for service.

NEW CARRIER LAW ON GASOLINE

Washington, D. C., Feb. 19—Representative Loudenslager, of New Jersey, has introduced a bill in congress to amend the act to amend section 4472 of the revised statutes so as to permit the transportation by steam vessels of gasoline and other products of petroleum when carried by motor vehicles when used as a source of motive power, so that the provision in said act which directs that all fire, if any, in such vehicles be extinguished before entering the said vessel and that the same be not relighted until after the vehicle shall have left the vessel, be amended to read as follows: "That all

fire, if any, in such vehicles or automobiles be extinguished immediately upon boarding said vessel and that the same be not relighted until each and every vehicle, animal and passenger shall have left the vessel. Provided, that such vehicles or automobiles and their occupants shall be the last to board the vessel." The bill was referred to the committee on interstate and foreign commerce for action.

NEW BILL WILL PASS

Albany, N. Y., Feb. 18—The Hill-Cocks automobile bill was favorably acted upon today by the assembly committee on internal affairs, but a few amendments were made. In regulating the registration and identification of motor vehicles and their use on highways the bill expressly states that the law shall not apply to motor cycles. The speed on bridges and dams is limited to 4 miles an hour. In case of accident the motor must be stopped and, upon request, the owner of the car must give his name and address.

Local authorities are not permitted to pass local ordinances affecting the registration or number of motor vehicles or prescribing a slower rate of speed than specified in this law. Fines for violations shall be not less than \$25 and not exceeding \$50 for the first offense.

BUFFALO CLUB AND TRADE

Buffalo, N. Y., Feb. 22—The Buffalo Automobile Club, although the largest and one of the most prosperous of American automobile clubs, is also probably the most remarkable for its modest dues, which are only \$5 per annum. The \$5 not only covers membership to the club, but also to the New York State Automobile As-

MOTOR

MOTOR BOATS THE ATTRACTION

New York, Feb. 20—The sportsman's show, which opened last evening, has taken on an entirely new phase and gives convincing testimony of the overwhelming popularity of the automobile boat. Heretofore while launches have been exhibited as a part of the sportsman's outfit little attention has been paid to them, and the great features of the show have been the game and woodland exhibits, the guides and the Indians.

This year there are no Indians and the camps and woodland exhibits are cut down to a minimum, while all available space is given to motor boats. The "lake," always a prominent feature, has been reserved for launches, and nearly all the main floor space around it is devoted to exhibits of motor boats and marine motors. The lake is covered with an entirely new type of boat, the high-speed model, of extremely light construction, fitted with the latest type of automobile motor. Not only the recognized launch builders, such as the Gas Engine & Power Co. and the Standard Construction Co. are represented, but the automobile makers are equally in the competition.

Smith & Mabley, Hollander & Tangeman and A. Massenet & Co., the representatives of Panhard and Levassor, are all present with new boats of the latest design and construction.

The regular type of American launch and launch motor is well represented by the Truscott Boat Mfg. Co., Lozier Motor Co., Western Launch & Engine Co., Eagle, and other prominent concerns, these showing launches and motors which attract general attention as appealing to the wants of the average launch user. As a matter of course, however, the rac-

sociation and the American Automobile Association.

The Buffalo automobile show opens 2 weeks from today and as the majority of the local agents do not expect their samples shipped by the factories until this week there will be considerable anxiety as to whether the cars will all arrive in time, as the freight traffic is much congested.

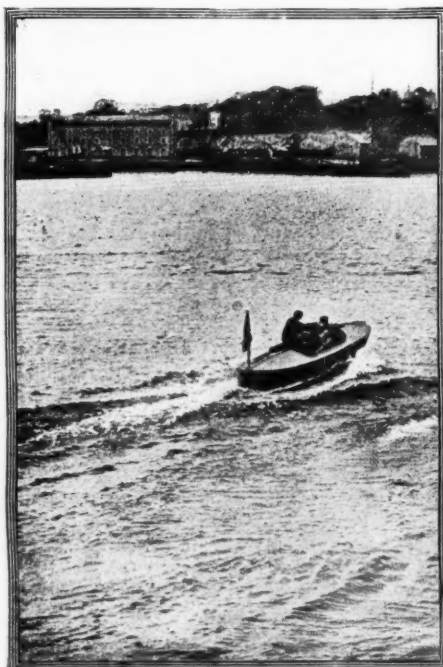
Gus G. Buse, the White and Northern agent, has formed a company which will hereafter be known as the Gus G. Buse Auto Co. It has secured a desirable location at 222 Pearl street and will have a well equipped garage.

The Ripper Motor Carriage Co. closed for the Glide agency at the Chicago show.

The Buffalo tradesmen who visited the Chicago show were much pleased and almost without exception claimed the Chicago show equally as good as the Madison Square garden exhibit.

HOT AFTER GLASS THROWERS

The Pittsburg, Pa., consulate of the American Motor League is taking hold of league work with a vim worthy of emulation by the consulates in other cities and towns. The Pittsburg organization has been formed only a short



ing boats are the sensation of the show, and the edges of the lake are thickly crowded at all hours.

The exhibit of racing craft is too new to be described offhand. Each boat presents peculiarities of model, construction and powering which demand a careful study. Interesting as this part of the show is to Americans, it is still more important to the foreign builders, as it proves that their temporary superiority is already threatened. To the motorist the whole exhibit is interesting in the extreme as showing the astounding influence of the automobile industry on a far older and more firmly established business, that of marine motor building. As yet many spaces show only the sign "snow bound," and it will be several days before the show assumes final shape.

CROKER'S NEW BOAT

New York, Feb. 22—Frank Croker's motor boat hull, designed and built by Charles Herreshoff, was placed on exhibition last week. It is to be fitted by Alexander Fischer with two 24-horsepower Rochet-Schneider motors. The hull is 43 feet over all and is

time, but it has already done some effective work and is making itself felt by its energetic labors. One of its latest moves was the issuance of a large poster offering a reward of \$5 for information leading to the arrest and conviction of any person violating the following city ordinance: "Any person who shall put, place, deposit or throw any broken glass, crockery, chinaware, cuttings of tin or sheet iron, nails, hoopskirts or other articles calculated to wound, bruise or maim man or beast, on or into any public street or highway in the city of Pittsburg, shall pay a fine of \$5, to be recovered summarily before any alderman of the city of Pittsburg." The consulate is growing each week, the officials having, by their own hustling, surrounded themselves with a force of earnest workers.

WILL USE 32-HORSEPOWER CAR

Syracuse, N. Y., Feb. 22—C. Allen Hayden, of New York, came here during the week and made arrangements for the manufacture of a 32-horsepower car to carry two persons. Mr. Hayden will use the car in touring the British Isles and Europe during the coming spring and summer. One of the principal conditions of the contract is that the machine must be able to travel at least 50 miles an hour. Mr. Hayden wants a rig which can compete with any he happens to meet on the road. When completed his car will weigh 1,700 pounds. Mr. Hayden is a member of the Automobile Club of America and will use his new machine in New York until May 16, when it will be crated and shipped to Europe. The continent will be visited and early in June Mr. Hayden will go to Germany to witness the cup race.

BOATS

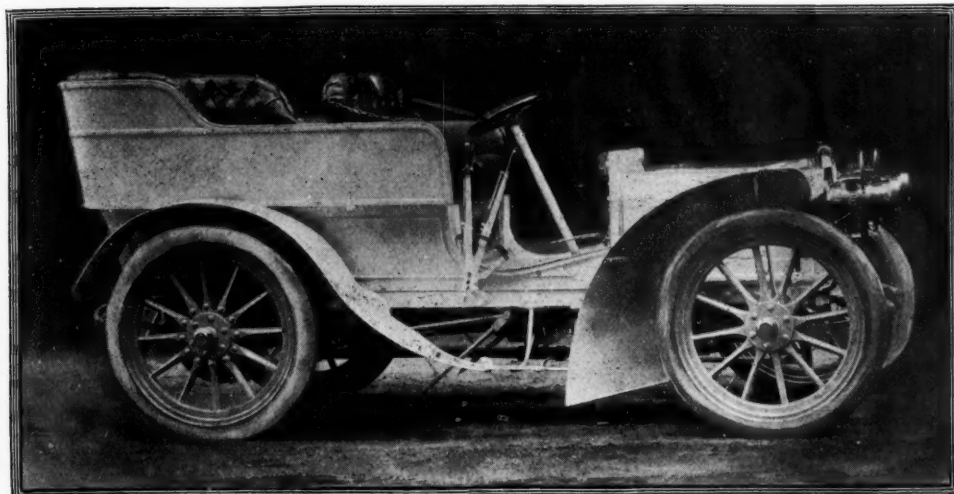
made of Honduras mahogany in two layers, the inside planes being laid on the bias and cemented to the outer layer. There is also an outside coating of the cement, whose composition is secret. The boat is almost entirely decked over. It has a cockpit forward for the steersman, who also operates the engines; a cockpit amidships, for the engines, which are placed side by side, instead of tandem, and a cockpit aft for four passengers. The hull weighs 540 pounds and the engines about 500 pounds. The boat draws 6 inches of water. Mr. Croker will take his boat abroad as soon as the engines, which are now ready, are put in and will race it in match and open contests. A speed of 27 miles an hour is expected.

CUP ENTRIES EXTENDED

New York, Feb. 24.—Announcement is made that the time for closing the entry list for the Harmsworth cup international motor boat race has been extended to June 20. On the strength of the Automobile Club of America has opened the American list and will receive entries until June 1. Smith & Mahley have already entered Vingt-et-Un. If only two more entries are received, the American team will be complete; if more than two are received, trial heats will be run to eliminate all but three. With all the speed propositions being constructed the American team of three should be complete.

Motor boat, power boat, speed launch, launch, automobile boat, auto boat, watermobile are a few of the names given the craft propelled by gasoline engines.

THE BENZ-PARSIFAL CAR



MOTOR AGE

THE 22-HORSEPOWER BENZ-PARSIFAL CAR

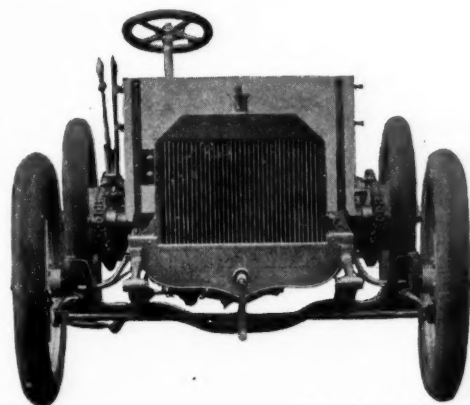
THE name Benz has been linked with the automobile since its beginning and a few of the earlier cars produced by Carl Benz at Mannheim, Germany, were brought to this country, but the modern representatives of this honorable line of German-made motor cars have never been extensively imported. Last season the Mead Cycle Co., of Chicago, took hold of the machine and was so successful in handling it that arrangements were made to import it on a much greater scale this season. Consequently a general introduction of the Benz-Parsifal, as the car is now called, is anticipated.

Like most European automobiles the Benz is made in a multitude of patterns, all based on two and four-cylinder chassis. The latter are of two kinds, those with propeller shaft and those with double side chain final drive. The 1904 four-cylinder car, with double chain drive, which the Mead company exhibited at the Chicago show, is a good example of Benz construction.

It is a 2200-pound, 18 to 22-horsepower, four or six-passenger car, with a wheel base of 91 inches and standard tread. The wheels are 36 inches in diameter and are fitted with 4½-inch clincher tires of the continental style, the imported cars being fitted here with continental pattern Diamond tires. Both axles are approximately 2 inches in diameter and of solid steel, with the spring seats forged integrally with them. The front axle has the downward curve characteristic of European machines, but the clearance here, as throughout the machine, is greater than it is in the average French car. The rear axle is slightly arched and the ends of both axles are pitched sufficiently downward to give the wheels a slight inward pitch or dish. The front axle has the jaw style of steering knuckle, but this is of unusually heavy construction, and in it the length of the steering head is entirely above the axle itself. The steering knuckle pin is phosphor bronze bushed and is adjusted and locked from the bottom of the head. The connection between the two knuckle lever arms is in front of the axle.

The wheels are, of course, of wood. They run on ball bearings front and rear. These bearings are peculiar, for instead of having the ordinary adjustable two or three contact point set of cones and cups, the balls run in outer and inner races, each formed of an annular ring with a curved recess or raceway.

The line of thrust is like that of a four-point bearing, but there are, of course, only two contact lines in each bearing. The inner ring is solid and slips over the axle with a key and keyway engagement to prevent turning. The assembling of the bearing is done in a peculiar way. In the inner or axle ring there is a slight depression across the face of the race-



MOTOR AGE

THE BENZ HEAD-ON

way. This allows the balls to be slipped in between the two rings, although at other points the distance between the edges of the rings is less than the diameter of the balls, making the bearing, when assembled, self retaining. The depression through which the balls are inserted is filled with a hardened and ground piece which just completes the ring, making its entire periphery without a break. This piece is

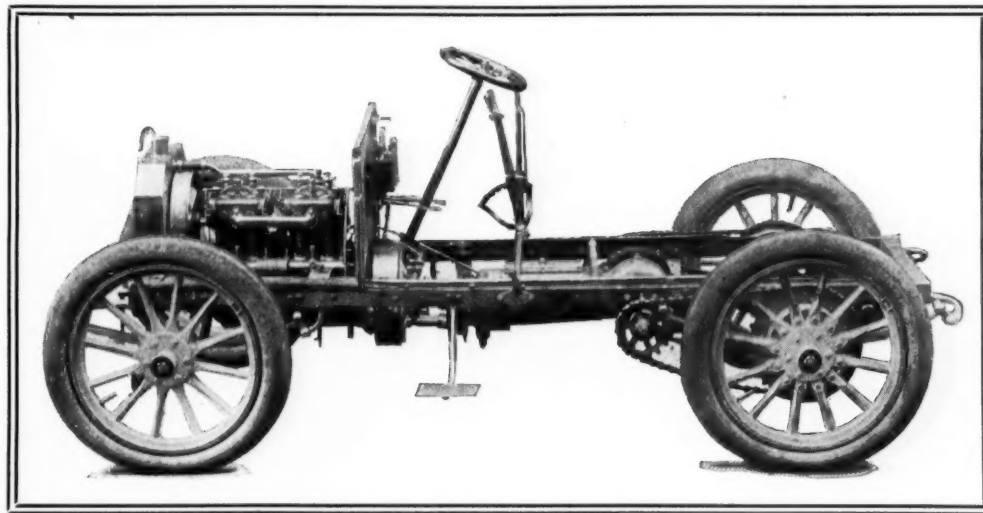
held in place by the removable key, which extends upward on each side of the ring to prevent the inserted piece from turning, and whose holding screw, inserted through both key and ring, extends also through the loose piece to secure it rigidly in position. When assembled the break in the continuity of the ring is barely noticeable, it being probable that the raceway is ground after the loose piece has been fitted to it, the piece then being removed for the assembling of the bearing and finally reinserted. The axle ends are 1⅝ inches in diameter at the inner end of the wheel hub and 1⅜ inches at the outer end.

The sprockets on the rear wheels, instead of being attached through arms or rods extending inwardly from the spokes, are integrally formed on stout rings or cups, each of which is attached by bolts, one through each of the twelve spokes, close down onto the hub of the wheel. The drum for the internal expanding brake on each wheel is attached directly to the inner face of the sprocket by bolts. These brakes are of the metal-to-metal pattern and are strongly secured, the expanding shoes being pivoted directly on a short ear on the rear axle.

The springs, front and rear, are semi-elliptical, and all are of five leaves and 1¾ inches wide. The front springs are 34 inches long and the rear ones 40 inches long. They are hung by the usual "pump handle" frame extensions at the outer ends and by curved hangers at the inner ends. Each spring has a rubber buffer.

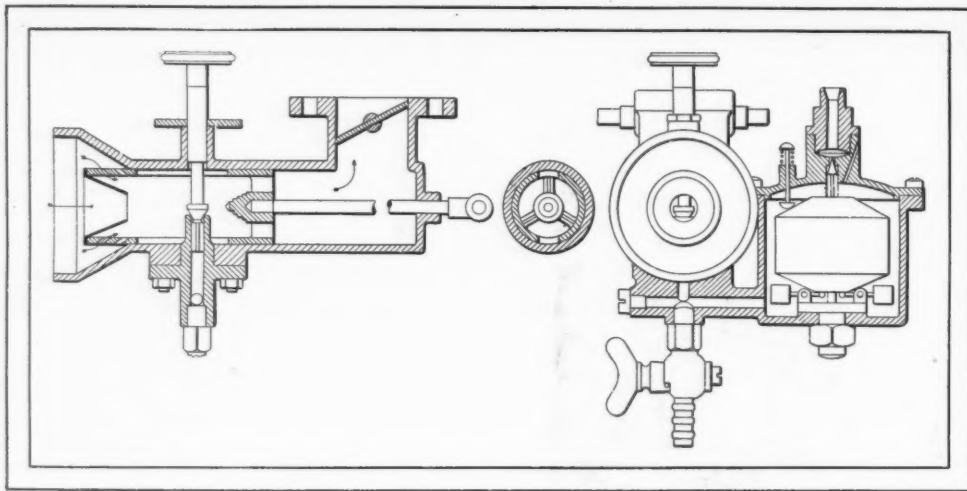
The running gear frame is of wood, the side bars being 3 inches high by 2 inches wide. They are armored with steel fitch plates whose widths taper down toward each end, and which are bent over inwardly at the top to form flanges to increase lateral rigidity. There is no sub-frame. The ends of the frame are closed by cross bars, but the motor is mounted directly upon the main side bars by arms cast upon the crank case. The crank case is held by what might be termed a sub-frame, but which is in reality a pair of main frame cross bars of channel steel, sufficiently dropped in their middle portion to receive the gear case at its correct vertical position. Otherwise the running gear is clear of framing.

The steering gear comprises the accepted form of worm and segment gearing. The wheel shaft extends upward through a hollow rigid post, and carries the throttle governor and spark lead controlling mediums. So far as the steering post parts are concerned, these comprise levers on top the wheel with worm



MOTOR AGE

CHASSIS OF THE FOUR-CYLINDER BENZ



MOTOR AGE

THE BENZ CARBURETOR

and gear connections whereby they act to raise and lower ring collars on the extreme lower end of the steering post. This upward and downward movement of the collars is independent of the rotation of the steering post and is utilized to actuate the throttle governor and the ignition elements, which the levers on the wheel are intended to control. Two ordinary distance rods with turn buckles for adjustment, and two double-legged sprags, complete the running gear proper.

The motor consists of two of the regular Benz two-cylinder vertical motors, with the cylinders of each pair in a single casting comprising cylinders, heads and valve chambers, and with a continuous water jacket over each pair. The aluminum crank chambers for the two pairs of cylinders are separate, but are set closely together and there is but one crank shaft for all four pistons. The crank shaft bearings have bronze bushings with babbit centers. These are set in journal boxes which extend past their ends somewhat to form oil retaining pockets. The bore of each cylinder is $3\frac{1}{2}$ inches, the stroke 4.5-16 inches, and the normal speed of the motor 900 revolutions. It is said that the speed of the engine may be varied from 250 to 1,200 revolutions.

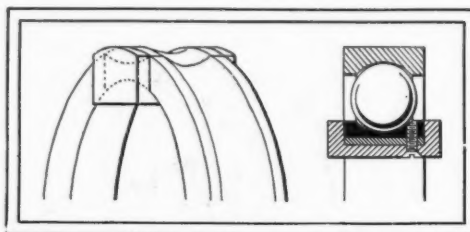
All the valves are mechanically operated, the inlet valves being on the left side of the motor and the exhaust valves on the right. The valves themselves are easily removable, each pair of exhaust or inlet valves being held down by double arm cross-bars which are themselves secured to the cylinder head, each by a central bolt and nut. Removing this nut and taking off the cross bar allows the valve to be lifted out. The valve springs are retained by being turned crosswise at the end and inserted through a cross hole in the valve stem.

The valve cam shafts are enclosed in the crank cases and thus run in oil, but the gears are outside, at the rear end of the case. The gear on the inlet valve cam shaft drives the magneto shaft, while a pinion on the latter shaft drives the pump. The commutator is directly on the front end of the exhaust valve cam shaft, while the governor is on the gear on the same shaft.

The motor has both jump spark and make-and-break ignition. The former is supplied with current from a two-cell storage battery, through four small induction coils and a commutator of usual form, and is used chiefly for starting, for testing to see whether the make-and-break ignition is at fault, and in cases of emergency. The make-and-break ignition is used for the regular driving and its current is furnished by a low tension magneto placed upon the side of the engine crank case. The

make-and-break device is in each instance on the end face of the valve chamber with the electrodes extending into the chamber, directly below the inlet valve. It is actuated by a push rod given its motion by the inlet valve cam shaft. There is a knife switch in each ground circuit of the make-and-break system. All of the wires leading to the cylinders are rubber covered and contained for the length of the motor in a longitudinal brass tube.

The water circulation system includes a typical cellular radiator with a fan that is belt driven from the motor, and a gear pump. A feature of the pump is a reservoir, or stand



MOTOR AGE

THE BENZ WHEEL BEARING

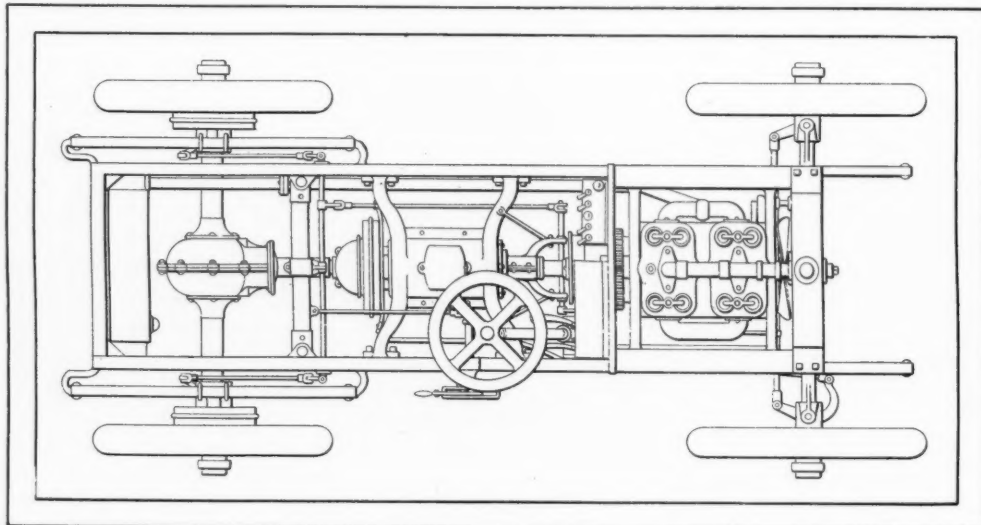
pipe, directly above it to render the action constant and to prevent the pumping of air. The water in circulation goes from the pump to the base of the cylinder water jacket; from the top of the jacket to the top of the radiator; from the bottom of the radiator to the pump. The whole system contains 3 gallons of water.

The carburetor is peculiar to the machine. It has the regular float feed chamber with hollow metal float and with an ordinary flusher. The supply of fuel to the mixing chamber is through a vertical passage regulated by a needle valve. The mixing chamber is in the form a horizontal cylinder, with the needle

valve approximately in its center. At one end the chamber enlarges into an open funnel, through which the air is drawn. Within the chamber is a closely fitting cylinder adapted to slide backward and forward, and this movement is controlled by a rod which extends out of the mixing chamber at the end opposite the funnel. At the funnel end of the chamber the sliding tube has a series of peripheral holes and also an inwardly extending conical nozzle. At its other end this tube is provided with a stepped cone, intended to break up the gasoline drawn against it by the inrush of air from the open end of the chamber. Past this cone the mixture passes upward by a simple rocking valve, which, by exteriorly applied control, regulates the amount of fuel passing to the motor and thus becomes a throttle. The action of the carburetor to allow the quantity of mixture taken to the engine to vary without varying its quality or richness, is as simple as its construction. When the sliding tube is extended outward into the large funnel on the mixing chamber, the incoming air current passes into it through the peripheral holes as well as through the small inner funnel. The current is thus somewhat dissipated and does not draw as heavy a charge of gasoline through the needle valve and against the spraying cone as though it were a stronger current. As the sliding tube is moved inward the tendency is to cut off the entrance of air through the peripheral holes and to centralize it into a stronger current through the inner nozzle, which also, by virtue of its nearer position to the needle valve, causes a more forcible rush of air into the chamber and the consequent picking up of a heavier charge of gasoline. This regulation of the air current is gradual between its limits.

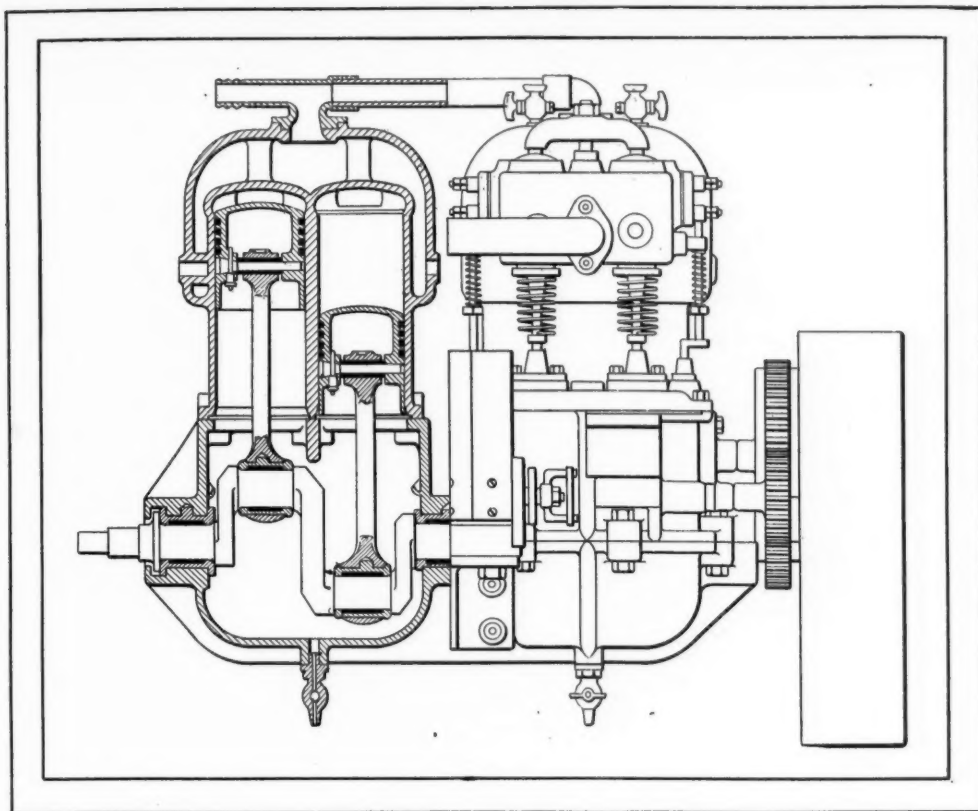
The inlet of the fuel to the cylinders is through a T pipe which terminates at each extremity in a chamber between the inlet valve chambers of each pair of cylinders. Each cylinder thus draws its charge through the same length of pipe from the carburetor. The gasoline tank, which is under the driver's seat, holds 18 gallons. In the gasoline pipe between the tank and the carburetor there is a small chamber with a water filter. This section of the pipe is sunk 2 inches below the level to afford a natural drain for impurities in the fuel.

The lubrication of the motor is, of course, by the splash system, with oil supplied from a sight feed lubricator on the dash board of the car. This lubricator is of the pressure feed variety, the pressure being taken from



MOTOR AGE

CHASSIS OF PROPELLER SHAFT DRIVEN BENZ



MOTOR AGE

THE BENZ FOUR-CYLINDER MOTOR

the muffler. It includes a supplementary tank with hand pump to use in emergencies and to clean out the feed tubes should they become clogged. Each cylinder has an independent relief cock on its head and each cock is provided with a small end funnel to be used as a convenience in pouring kerosene into the cylinders to clean them or when priming the cylinders. On each crank case is a pressure vent in the form of a small brass stand pipe with perforated cover to prevent the splashing of oil. There is an open oil relief cock to maintain the correct maximum oil level in the case, and there is also the usual drain pet cock on the bottom of each case.

While the motor is started on the jump spark ignition system, it is intended to be run mainly on the make-and-break system, and hence the commutator of the jump spark system does not provide for any great speed. It does, however, provide long contacts, so that the motor may be started readily from almost all points. The limited spark lead of this system is controlled by the upper lever on the steering wheel. The lower lever controls the governor, which acts directly upon the throttle and is hence the principal speed controlling element. The action of the manually controlled governor, which, as previously mentioned, is on the exhaust valve cam shaft gear, and which is of the ball type, is two-fold. In the first place it regulates the throttle opening on the carbureter. Inasmuch as the action of the sliding tube in the mixing chamber of the carbureter whereby the mixture of air and gasoline is regulated according to the speed of the motor and the quantity of the final charge of fuel taken to the motor is mechanical, it becomes a necessary part of the action of the governor to operate this sliding piece simultaneously with the action of the throttle. The manual control of the steering wheel simply limits or releases the action of the engine governor. A pedal furnishes an instant and complete cut-out of the fuel supply.

The needle valve which regulates the initial flow of gasoline into the mixing chamber of the

carbureter need only be changed to provide for changes in atmosphere, or, more broadly, weather changes. To render its adjustment convenient, however, the needle valve regulating means are carried upward to the top of the dashboard, within easy reach of the driver from his seat.

The transmission is through the usual fly wheel cone clutch to a four-speed and reverse sliding gear set. A feature of the clutch, which is of large diameter, is that the leather faced male member, when drawn out of engagement, is brought into contact with a fiber lined brake shoe, which, by bearing against the edge of the clutch member, tends to stop its rotation.

The transmission gear is held in an aluminum case and its main shaft is connected to the clutch shaft through a two-part coupling, the separation of which permits the instant removal of the clutch. The shafts of the transmission gear run on ball bearings. The set is simple with a direct drive on the high speed, the secondary shaft then running idle. In the gear for the car with the double side chain drive, the differential gear is in an extension

of the case, on a cross counter shaft running on ball bearings and fitted with a pedal operated band brake. This shaft is, of course, driven by a bevel pinion and gear. It is held in long bearings on the side frame members, with universal joints at each end, just inside the bearings. In the propeller shaft model the differential gear is, of course, on the rear axle. In this model, also, the transmission gear case, instead of being supported on two cross channel bars, is hung directly upon the side members of the main frame by means of long arms cast integrally with the under half of the case. The frame of the propeller shaft model is, incidentally, of the pressed steel variety instead of armored wood construction as in the other models.

All of the speed changes are obtained by one side lever. Another side lever operates the rear wheel brakes. The clutch is operated by a pedal. Another pedal throws out the clutch and applies the counter shaft band brake.

The final drive of the chain model is by two roller chains, $\frac{7}{8}$ -inch wide and of $1\frac{1}{2}$ -inch pitch. A feature of the chain system is a supplementary link which allows the insertion of just half the length of a complete link, or of one pitch unit of chain instead of two. This is convenient in adjusting the length of the chain within limits greater than that of the distance rod adjustment and not so great as two full pitch units. Another small feature, and one which appears throughout the machine, is the fastening of each nut by a cross cotter pin, there being six slots across the face of the nut to engage this pin, no matter at what point it becomes tightened.

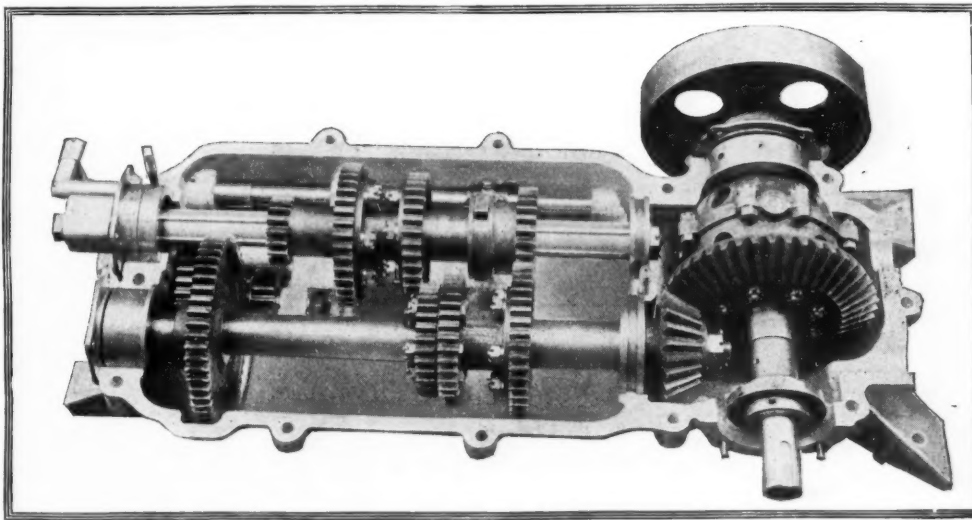
The body on the Benz, like that of most European cars, is much at the option of the purchaser, any style of body being adaptable to the chassis, which is complete in itself. The general body construction is such that the whole body may be removed by taking out eight bolts. The rear fenders extend to the step; the front are plowshare and all are independent of the body, and are not affected by its removal.

RECENT INCORPORATIONS

St. Louis, Mo.—American Automobile Transit Co., capital stock, \$12,500. Incorporators, O. P. Lanigan, A. G. Lewis, G. F. Eggert, L. B. Lanigan, A. D. Anderson and Myron Peers.

New York—New York Auto Transfer Co., capital stock, \$100,000. Directors, G. W. Loft, S. M. Fischer, R. S. Hillferty.

Louisville, Ky.—The Kentucky Automobile Co., capital stock, \$24,000. Incorporators, Ira S. Barnett, A. Levy, Hubert Levy.



MOTOR AGE

THE BENZ SLIDING GEAR TRANSMISSION

THE READERS' CLEARING HOUSE

POWER BY FLY WHEEL INCREASE

Stanwick, N. J.—Editor MOTOR AGE—What horsepower will a gasoline engine of 5¼-inch bore and 6-inch stroke, and with a fly wheel 22 inches in diameter, of 5-inch face and weighing 150 pounds, develop at 700 and at 750 revolutions? How much power would this motor develop with another fly wheel of the same weight and size? Would the additional fly wheel be safe at the speed given?—N. O. W.

The motor would develop about 8½-horsepower at 700 revolutions and about 9-horsepower at 750 revolutions. The fly wheel is heavy enough. The addition of another of the same weight would serve no purpose.

USE OF PICRIC ACID

Rochester, Ind.—Editor MOTOR AGE—What is the kind and amount of acid used per gallon of gasoline to increase the speed and efficiency of the motor?—J. P. STINSON.

Picric acid is used to increase the efficiency of gasoline motors. The advisability of its use is doubtful, however. It has been tried with varying results. The following treatise on picric acid and its use, by H. A. Thiersch in an English paper, is fairly comprehensive of the question.

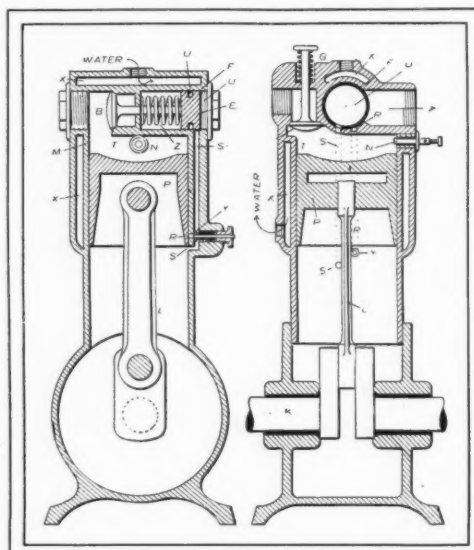
"Picric acid is prepared from carbolic acid—phenol—by treating it with nitric acid, a process known as nitration. It forms small yellow crystals with an intensely bitter taste, but is not, unless in very large quantities, actually poisonous. Though it can be handled with practically absolute safety, it can also be made to behave as a very powerful explosive. It is slightly soluble in gasoline. These last two facts show at once that it might conceivably be used to 'enrich' gasoline.

"Now, supposing there are two explosives, both normally generating the same volume of gases, the one which produces the greater heat will be the more powerful. As both the volume of gases and their temperature can be calculated from the known composition of any explosive, it is easy to see how they compare as to energy. Examined in this way, picric acid is, weight for weight, more powerful than a gasoline-air mixture, and should apparently have advantages over this. But as picric acid is a solid and cannot be vaporized under the conditions obtaining in an explosion motor, it must plainly be mixed or dissolved in a medium, such as gasoline or alcohol, which will carry it into the cylinder.

"Further, as picric acid cannot be readily exploded either by a flame or by any electrical firing system, it is necessary that the carrying medium should itself be of an explosive nature. For it has been proved that picric acid can usually only be fired by an initial detonation; that is, by the explosion of some substance either in contact with it or in close proximity. This result is obtained by dissolving the picric acid in a solvent such as gasoline, and carrying this, vaporized and mixed with air, into the combustion chamber. The gasoline-air mixture is fired by the spark in the usual way, in turn exploding the picric acid; and, as the two explosions take place with almost instantaneous rapidity, they may be considered as simultaneous. The practical result is therefore that the spark fires the picric-gasoline-air mixture, giving greater power than with one consisting of gasoline and air only.

"The quantity of picric acid used should not be large, as experiments have shown that, if it materially exceeds 5 per cent of the gasoline, firing is not certain. That is, the initial explosion is insufficiently strong to explode a greater proportion of picric acid. Even this very dilute mixture seems to materially increase the power—exactly by how much has not yet been determined but it probably varies from 5 to 15 per cent.

"But picric acid has two very great disadvantages. It acts very strongly on metals, corroding them, and the products of explosion



THE GOODRICH MOTOR

invariably contain corrosive gases. Not only the gasoline tank, but every part of the motor which could come in contact with the acid would very speedily become corroded, and accurate working of the parts would soon become impossible. Further, as picric acid is not volatile, while gasoline is, as soon as this is vaporized the picric acid must separate, the result being that it is present in the 'mixture' as a very fine powder or dust. It is therefore reasonable to expect that much of the acid will be deposited on every part of the motor between the carburetor and the combustion chamber. This is actually the case, and a small portion of the picric acid never gets so far as to assist in the explosion. The inlet valve gradually becomes choked, and ceases to work satisfactorily, and after some time would become seriously pitted and corroded. As the carburetor is constantly in contact with the acid, it would be acted on in a similar way.

"The other point, that of the corrosive products of combustion, is not so serious. With efficient lubrication of the cylinder, which is, of course, in any case essential, corrosion need not be feared, as metal which is thoroughly oily or greasy is not attacked by such gases.

GEARLESS FOUR-CYCLE MOTOR

Chicago—Editor MOTOR AGE—The accompanying drawings show a four-cycle gasoline motor which, by the construction of its valves, has several advantages over the ordinary four-cycle motor. In the first place, the motor may be built much more cheaply than the ordinary engine because it has no valve operating cam shafts and gearing; then, the exhaust valve being actuated by the impulse it-

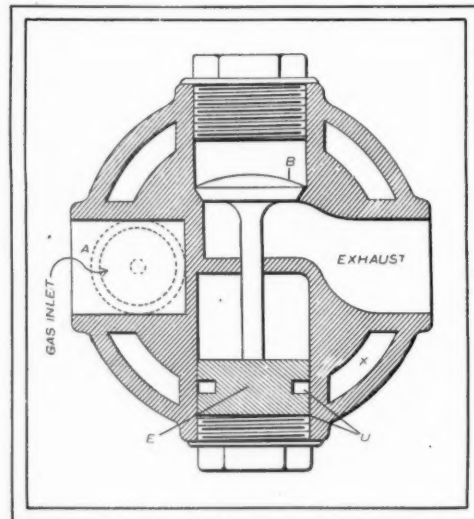
self there can be no exhaust of unburned gases, and hence the fuel consumption will be economical; finally, the motor should be extremely flexible in speed control.

The motor consists of a cylinder M, surrounding the piston P, which is connected by the rod L to the crank shaft K. The port or cavity X, surrounding the cylinder wall is the water jacket, and is connected by suitable pipes to a source of circulating water. The auxiliary cylinder F, attached to the cylinder, contains the auxiliary piston E. R and S are ports or passages connecting the main cylinder cavity T with the cavity U in the auxiliary cylinder.

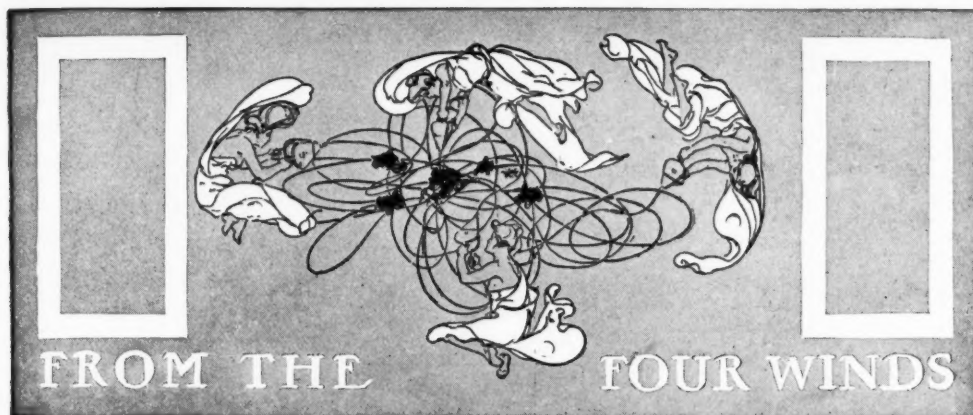
The operation of the valves is as follows: The gas mixture enters from the carburetor, or mixing valve, through the valve A, which is an atmospherically operated valve, and opens when the piston P starts on the downward stroke, remaining open as long as a partial vacuum exists in the cylinder T, and closing at the beginning of the return stroke of the piston, thus causing compression of the gas in the cylinder. When the piston is in a position to start on the next downward stroke, the gas mixture in the cylinder is ignited by the electric spark at N, causing the impulse which forces the piston downward.

When the piston reaches the lower end of the stroke it causes the port R to be opened, and a portion of the initial pressure passes through the port into the cavity U. This forces the auxiliary piston E away from its seat, opening the exhaust valve B and holding it open until the piston P completes the upward stroke, which allows the burned charge to pass out into the atmosphere; while the lower edge of the piston P, by opening the port S, allows the pressure to fall to zero behind the auxiliary piston E. The spring Z then forces the auxiliary piston E to its seat, thus opening the port R and closing port S and the valve B. When the piston P starts downward, the gas valve A is opened, thus admitting another charge of gas mixture, and a succession of the events described occur.

The valve Y serves as a check valve to retain the pressure in the cavity U until released by the opening of the port S, which is effected by the piston P. The spring G is so placed as to cause a slight tension on the valve A to keep it normally closed. The auxiliary cylinder F may be placed on any part of the cylinder, with suitable port connections to the cavity U, directly operating the valve B without departing from the nature of the motor.—L. J. GOODRICH.



VALVE CHAMBER OF GOODRICH MOTOR



The Jefferson Automobile Livery Co., of Detroit, Mich., has decreased its capital stock from \$20,000 to \$2,000.

A new caravansary in Paris is called the Mercedes hotel, and it is presumably to be run primarily in the interests of motorists of 60-horsepower or more.

The children of the members of the Automobile Club of France were entertained with a ball on Valentine's day. This event occurred on Sunday, but that did not disturb the serenity of the occasion.

The landlord of the Black Swan Inn at Crawley, England, had his license suspended for a month because he refused to serve tea to a chauffeur. The landlord told the motorist that a "gentleman ought to know better than to order tea at an inn."

At the recent motor cycle and bicycle show, held in Manchester, England, 107 motor bicycles were exhibited. At the show held in 1903 only seventy-eight were exhibited, while in 1902 the number was eleven. The first and only motor cycle seen at a Manchester show was in 1900 and at the exposition held in the following year two were shown.

At one of its recent meetings the Autocycle Club of France decided to arrange a motor bicycle endurance run to take place the latter part of April. The course chosen is from Paris to Bordeaux and back, in four stages: Paris-Tours, Tours-Bordeaux, Bordeaux-Tours, and Tours-Paris. The approximate distance of the run is 725 miles.

At recent meetings of the different French automobile boards of trade it was practically decided that none of the manufacturers would exhibit at the international sport and hygiene exposition, which will be held in the Grand palais during the summer. The general opinion is that the show will not be of sufficient importance to warrant outlay in connection with it. It is possible, however, that those who manufacture automobile ambulances will show such vehicles only at this exhibition.

The Hungarian post and telegraph administration has decided to purchase eight motor cars, which will be used for collecting mail and parcels in large towns. Some of the conditions which bidders for the order must observe are: The cars must be equipped with a two-cylinder gasoline motor developing 10 horsepower; each car must be able to carry a maximum of 1,000 pounds, not including two persons; the maximum speed is to be 18½ miles per hour, and it is suggested that the cars shall be able to maintain an average speed of

3 miles per hour in climbing hills having 7 per cent grade.

A private telephone line has been built between the Lansing and Detroit plants of the Olds Motor Works. The line is over 100 miles long.

The E. W. Bliss Co., of Brooklyn, N. Y., has taken up the manufacture of automobiles, and experiments which have been made have been so satisfactory that plans are being made for the installation of a plant which will permit extensive operations along this line.

The automobile is beginning to fall a prey to poets, and may soon rank with soap and patent medicine as an inspiration producer for the long-haired gentry. Rudyard Kipling is the latest addition to the automobile paean singers. He is contributing a series of poems having motoring for their theme to the London Daily Times.

There were 1,332 automobiles and 714 motor bicycles in Belgium on December 6, 1901. One year later there were 1,991 cars and 1,427 motor bicycles. On the corresponding day of December, 1903, official reports show that there were 2,628 motor cars and 2,671 motor bicycles in actual use in Belgium. Thus the use of automobiles has almost doubled within 3 years and the use of motor bicycles is nearly four times as great.

The Automobile Club of Milwaukee, Wis., is agitating the question of a club house, but so far no definite action has been taken. Owing to the increasing interest in automobiling in Milwaukee there has been a considerable increase in the membership of the club, and as an active season has been planned, which will include a number of interesting club runs, it is thought there will be a further increase of membership this year. The club has never had quarters of its own, and the more progressive members are understood to heartily favor the clubroom plan.

A three-story automobile house is to be built for Andrew Carnegie at 55 East Ninetieth street, New York. The building will cost about \$20,000. It will be of fireproof construction with a front of white marble and Harvard pressed brick, of colonial style. On the lower floor will be the large storage room, lined entirely with white enameled brick and paved with red acid proof brick. In the rear will be the charging room. The two stories over the storage room in the front are to be equipped as living rooms for the man who will operate and care for the vehicles. Four electric automobiles will be stored in the house.

The Gardner-Serpollet concern, of Paris, has received an order for a number of 20-horsepower omnibuses for Martinique. Each omnibus must seat eighteen passengers and must have a part of the car built for carrying mail, parcels and dispatches.

The eighth annual cycle and motor show was opened at St. James's hall, Manchester, England, January 28, and continued until February 6. No motor cars were exhibited, but practically all the leading manufacturers of motors and cycles were represented, together with several tire firms.

The months of January and February have been strenuous ones among the makers of automobiles. There have been seven large shows in various parts of the world, besides several of lesser importance. New York, Brussels, Turin, Chicago, Amsterdam, Rome and London have each had successful shows, and the industry has profited exceedingly thereby.

The Continental Rubber Works, of Erie, Pa., has purchased the business and patents of the Milwaukee patent puncture-proof tire and will have the exclusive right to manufacture and sell this tire during the life of the patent. The tire will be manufactured and marketed direct from Erie, and will be marketed under the name of the Milwaukee patent puncture-proof tire.

M. C. Henley & Son, of Richmond, Ind., who have district agencies for a number of automobiles, are erecting a garage on Main street near Twelfth, in that city. The front of the building is two stories, and will be occupied as office, reception room and salesroom. A concrete driveway will lead through the entire building from Main street to the street at the rear. The one-story truss roof of the building will have a concrete floor and the entire building will be of fireproof material. It will be ready for occupancy about April 1.

The E. J. Willis Co., of New York, has made arrangements with the Quaker City Automobile Co. to represent it in Philadelphia, Pa., where a full line of all the automobile supplies manufactured and carried in stock by the Willis company will be carried. The Willis company is desirous of hearing from houses in other large cities who would care to represent it. The company has also added marine engines to its stock and will handle the Baldwin marine motors, and has taken the agency in New York for the Prescott steam automobile.

American automobilists who desire to tour England can save trouble and annoyance by communicating with S. M. Butler, secretary of the Automobile Club of America, and arranging through him with the secretary of the Automobile Club of Great Britain and Ireland for complying with the necessary requirements of the law. The secretary of the British club has written the secretary of the A. C. A. saying: "If you will give me 2 or 3 days' notice of the intention of any of your members coming here to tour, and will provide me at the same time with a description of their cars—the make, horsepower, color, etc.—the probable date of arrival and port of arrival, also the full name and address of the owner, I will have the necessary plates, together with license, ready for them at such landing point, by which means I think the least amount of delay and annoyance will be caused."

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OFFICIAL BULLETIN

GOOD ROADS IN SIGHT

The United States government is thinking it over. There is a proposition in congress to depart from the parsimonious and pickayune policy by which the "roads inquiry bureau" has been barely kept alive and to spend a few millions, or more exactly \$24,000,000, in the building of better roads. A bill known as the Brownlow-Latimer bill embodying the best features of the two bills recently introduced by Senator Latimer and Representative Brownlow, has been put under way in both houses and is gathering strength so rapidly that its prospect of success is fairly good.

THE BILL IS REASONABLE

The bill is more than reasonable; it is necessary. The sum proposed is neither large nor extravagant. Within the last 5 years we have spent about \$700,000,000 in the Philippine islands, and within the last 10 years the government has appropriated nearly \$180,000,000 for the improvement of rivers and harbors. Notwithstanding these and other large items of expense, the last treasury balance shows a surplus of nearly \$270,000,000.

Answering the charge, or rather the suggestion, that the proposed expenditure of money by the general government for road improvement in the several states savors of paternalism, Senator Latimer, of South Carolina, in a recent speech before the senate said:

"It has been said that the proposition of federal aid to improve the roads is paternalistic; that its tendency will be to cause the people to rely on the general government too largely, and not exercise their own resources and energies. But this argument has no basis in fact. Why is this plan paternalistic? Does it give to the people a sum of money out of the treasury of the general government to aid them in their private business? If it does, it is paternalistic; if it does not, it is not paternalistic. Are we to give a new meaning to the term 'paternalism'? Is it to mean from this time forth that any appropriation for a strictly public purpose, in line with the duty of the government and for the incidental benefit of the whole people as well as the state and general government, is paternalism? Does this bill do more than that? If it is paternalistic, then upon what reasoning do you defend appropriations for rivers and harbors, for removing obstructions in rivers within states, for destroying pests and diseases, and irrigating land, against the same objection? Are they not all more susceptible of being called paternalistic than this bill?

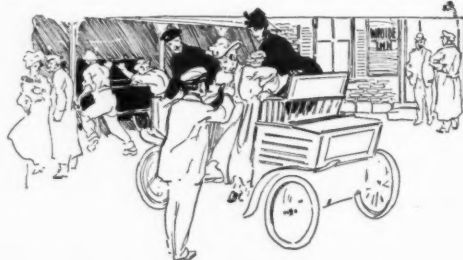
"Can any democrat who voted for a bounty on sugar, or believed in the principle, or who believes in the protection of the raw material of his state, consistently call this measure paternalistic? Can any republican who believes in the doctrine of protection oppose it on that ground? Let us be frank. Upon many other questions paternalistic tendencies may have appeared; and no one will deny that the people ought to rely in the first instance upon themselves in their private affairs, otherwise their independence, manhood and ability for self-government would inevitably be sapped and finally destroyed; but this is the first time that the evils of paternalism have been seriously invoked against a strictly public improvement, affecting the whole body of the people equally, distributing the burdens and benefits equally, and that is in line with the duty and within the means of the government. It must fall to the ground as being without the shadow of force or consistency."

DUTY OF EVERY AUTOMOBILIST

It is the duty of every thoughtful and patriotic citizen of this country to support this bill, and there is only one kind of support that will weigh one ounce in aiding its passage. The bill will succeed if members of the congress understand that the people are awake to the need of good roads and that an active sentiment exists in favor of the Brownlow-Latimer bill. There is an old proverb which says that the bashful dog goes hungry. People get very little without asking for it. As a rule officeholders are not leaders; they do less to create public sentiment than to test its trend and to answer its call. To this rule there is now and then a splendid exception. Once in a while we find in public office a man who is broad and brave and brainy enough to sit down by himself and work out the problems of human happiness and prosperity. He is the man whose hands should be upheld by thoughtful and progressive people.

HOW TO PASS THE BILL

Every friend of this measure should write to the member of congress who represents his

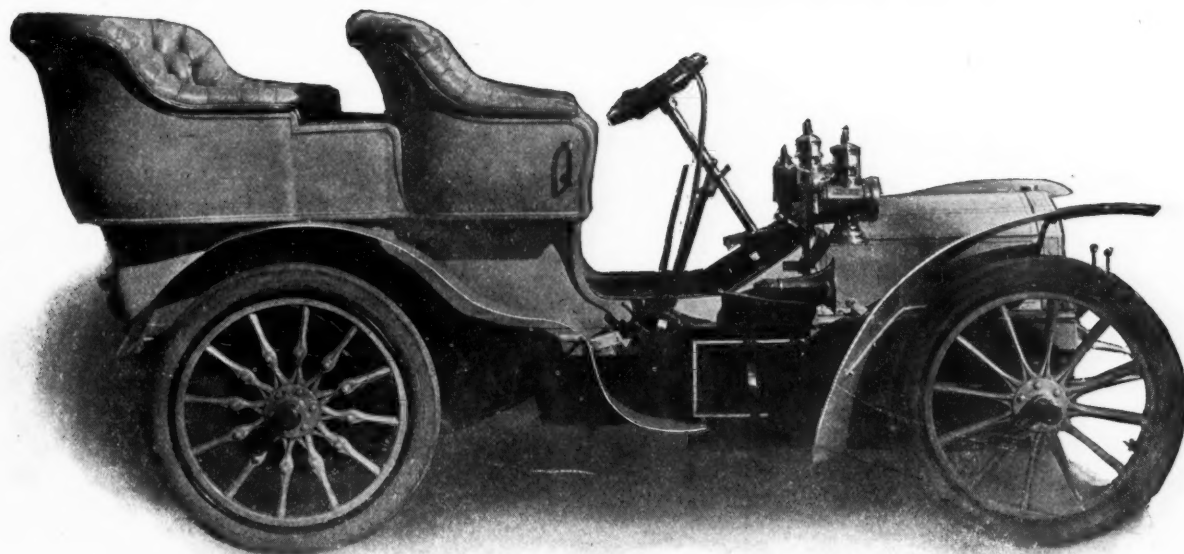


district and ask him to support the Brownlow-Latimer bill and to vote for its passage. If the name of a member of congress is forgotten it may be learned by inquiry of the local postmaster or the editor of the home paper. A similar letter should be sent to each of the two senators who represent your state at Washington. Every automobilist should bring the bill to the attention of his friends and neighbors and induce them to write to the national legislators at Washington. The importance of doing these things is beyond measure; the task is nothing.

COPIES OF THE BILL

A copy of the Brownlow-Latimer bill will be sent from league headquarters to any person who will take the trouble to send a postal card request. The bill provides that the sum of \$24,000,000 may be divided among the states and territories during the next 3 years, the division being made on the basis of population. Any state accepting its share of government money must appropriate a like sum out of its own treasury, so that, for example, a state receiving one million from the general government will expend two millions for better roads. The bill also provides for a bureau of highways under the direction of three commissioners, one from each of the two dominant political parties and the third an army engineer, all to be appointed by the president. The work of the commission is to be carried on as a part of the department of agriculture and its proceedings will be subject to the control of the secretary of that department.

The American Motor League is pledged by its constitution to support and encourage the work for better roads. Its supreme opportunity is here. It is not for the officers of the league to alone take up this work for they alone can do nothing. It is the time and the occasion for the "rank and file" of the organization to assert itself, and for each individual member to prove his personal worth and the worth of the great body of automobilists of which he is a member. There is a moral force in numbers—a force that is incalculable. Let every member do something in behalf of this bill now, and thereby raise himself in his own esteem and aid in carrying out the dignified purposes of the organization. It is the one movement that will make every farmer the friend of the automobilist and remove the only serious obstacle that retards the rapid and universal adoption of motor vehicles.



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IGNITION.—The Ignition is of the Magneto-Electric self-driven type, requiring no batteries or coils even in starting.

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GENERAL REMARKS: The Engine Bonnet is made of Aluminum and can be removed instantaneously. The gasoline tank is placed under rear of chassis and has a capacity for over 200 miles, and, owing to the forced-draught system of radiation, only 7 quarts of water are needed. The fan is contained in the fly-wheel. The engine and all working parts are protected from mud and dirt by an aluminum case fitted under the car.

FIAT CARS are fitted with various types of bodies, whose elegance is too well known to require any special description here. The standard types are: "King of the Belgians," "Leopold," and "Princess Laetizia." Any body, however, can be fitted to meet the customer's wishes.

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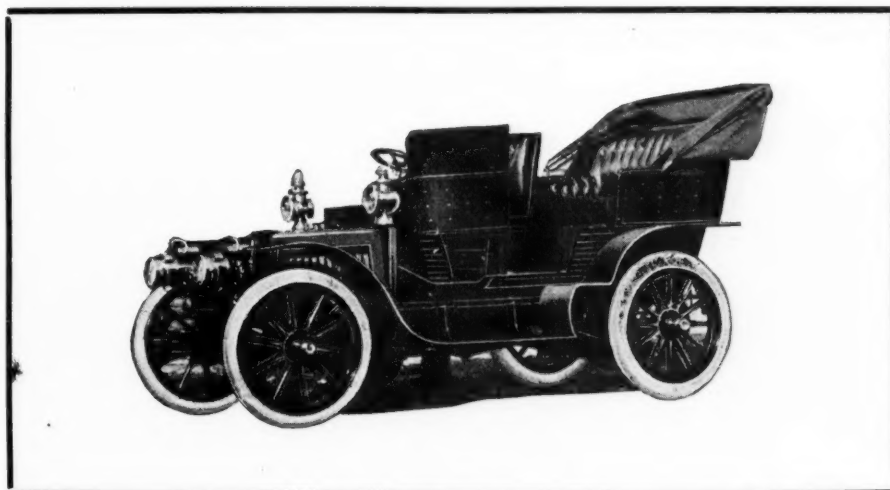
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of a discriminating buying public and judgment by qualified auto agents has been agreed upon: that Nationals "GO THE ROUTE," and that the combined

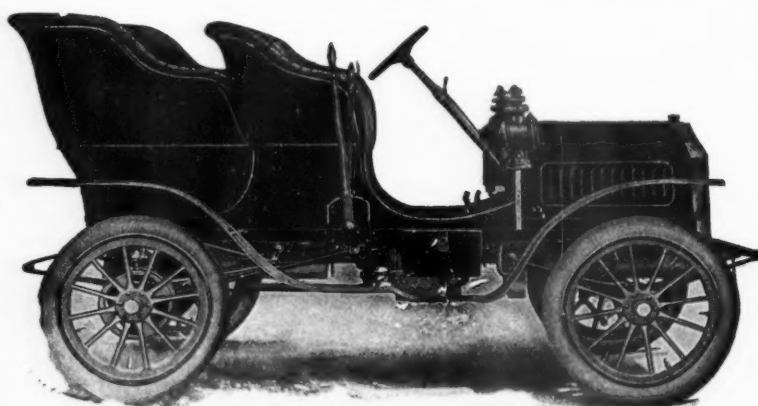
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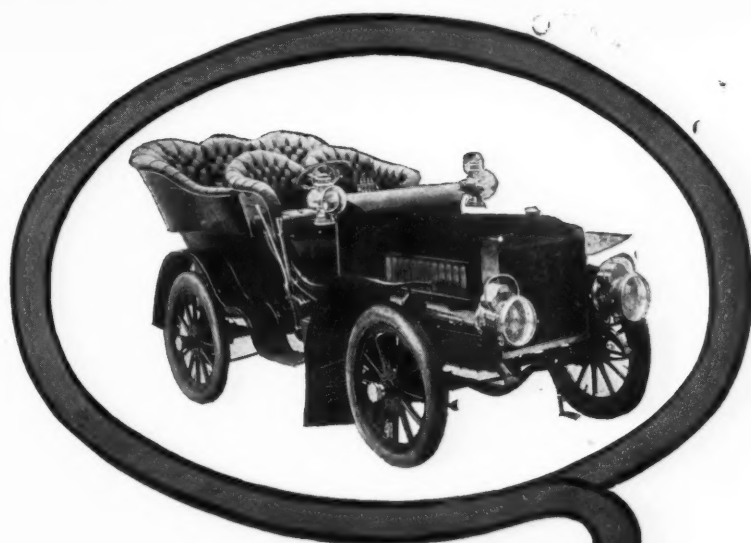
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At the shows—the admiration of visitors, the consternation of competitors.



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The Thomasine

This is the Flyer with the limousine body—The acme of motor car elegance ❧ ❧ ❧

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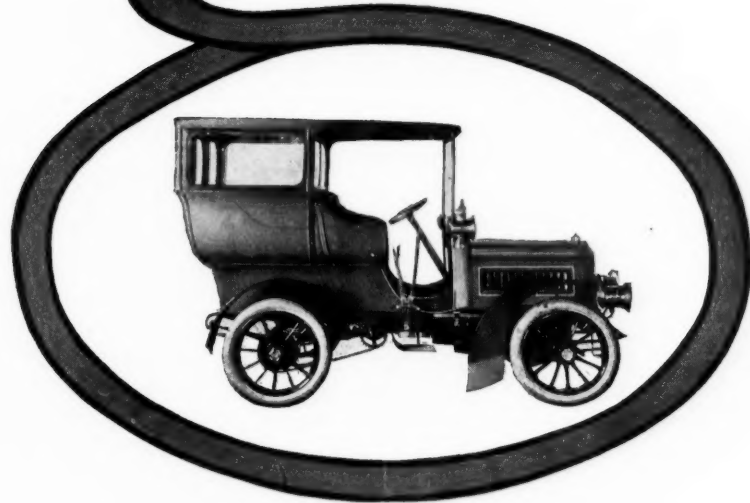
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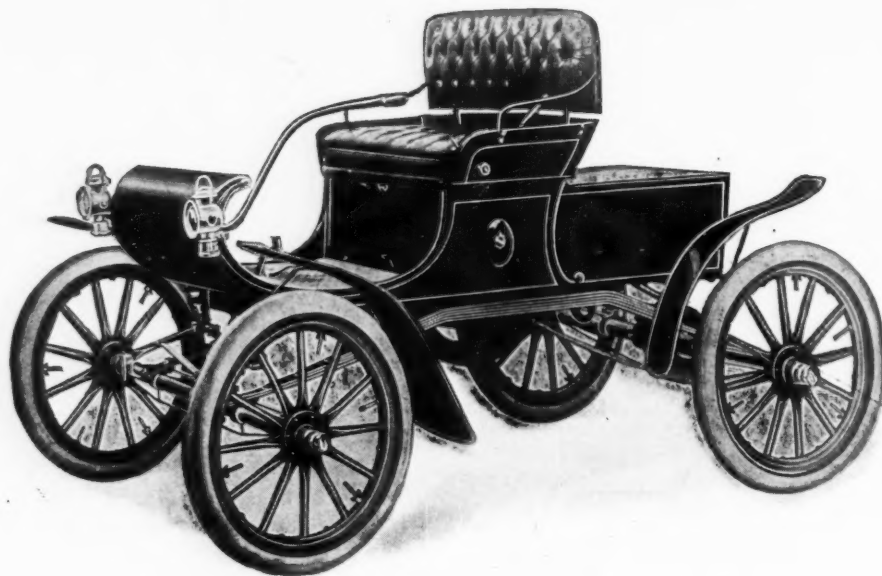
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New Automobiles are everywhere appearing whose makers have not the money nor the mechanical genius to test out their cars properly before they are placed on sale. The customer is left to discover their defects after they have made their purchase, much to their sorrow.

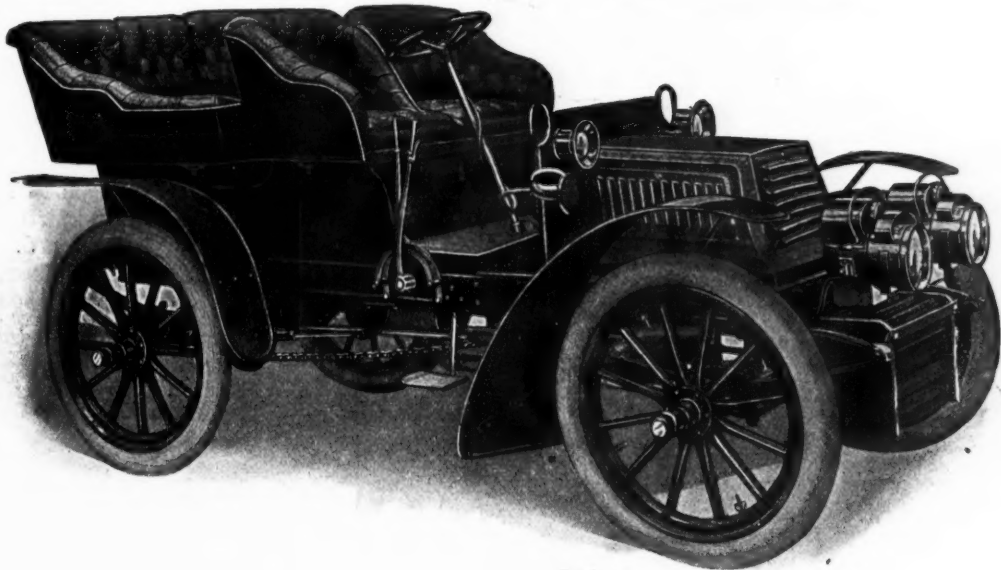
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Are unquestionably the world's highest type of electric motor cars. The perfection of the Special Pope-Waverley motor, with ample facilities for charging in every town or city where there is an electric light plant, accounts for the fact that the electric was so popular this year at the Automobile Shows. The accompanying cut shows the Pope-Waverley Model No. 30. It is by far the "smartest" station and general utility wagon yet produced. Motor equipment consists of two 3-horsepower motors, improved design, each capable of an overload capacity of an additional 3 H. P. Speeds 5 to 15 miles an hour. A safety switch for disconnecting the motors is conveniently located to the rear seat.

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"Toledo"

"The Quiet Mile-a-Minute Car" stands for the latest and best in automobile perfection

There isn't a whit of experiment nor an ounce of waste weight from tire to tonneau. Our 24-horsepower, 4-cylinder car (weight 2,350), sells at \$3,500. We make a 14-horsepower, 2-cylinder car, same quality, built along the same lines, price, \$2,000.

Our new 1904 Catalogues and name of our agent nearest you on request.



4-CYLINDER, 24 HORSEPOWER.

PRICE, \$3,500

MEMBERS ASSOCIATION LICENSED AUTOMOBILE MANUFACTURERS

The CADILLAC

Model A for 1904 has been improved in detail only; no one has suggested any change in the mechanical construction of its motor. After a full season's use, it "made good" every claim, and more. There were no freak ideas to discard, every principle involved was tried out to a finish, not one failed. Our customers have aided us in making detail

Improvements

for 1904, and with the new oiling system, which prevents fouling of combustion chamber in case a surplus of oil is used in splash box, a more efficient electric and switch system, 12 batteries instead of 8, oil and electric connections turned on at one operation, better insulation, a new heel board, more convenient grease cups, an improved priming device, a better brake system, more convenient adjustments, wood handles on sparking and throttle levers, new locking devices, better finish, and equipped with 3-inch G. & J. clincher tires and rubber foot mats at no extra charge, we have in this machine a tried out automobile of known quality and value. The price remains the same, \$750.00 for the Runabout, \$850.00 fitted with detachable tonneau.

Cadillac Automobile Co.

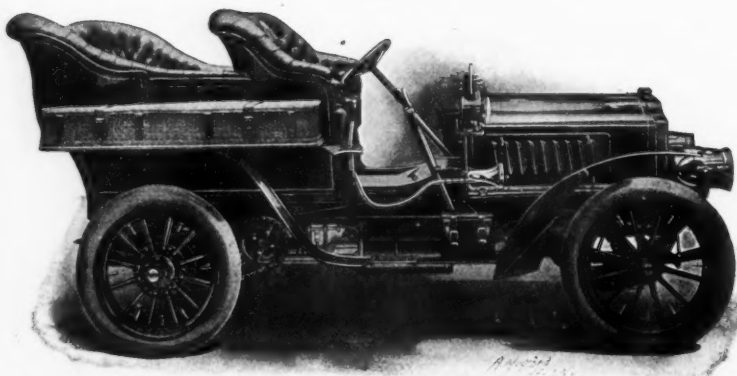
DETROIT,

Members of the Association of Licensed
Automobile Manufacturers.

MICHIGAN

Columbia

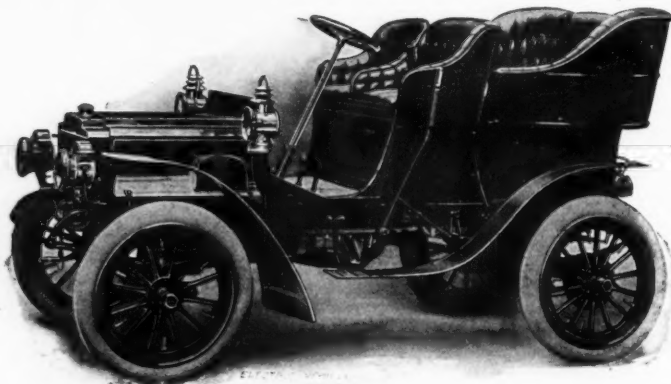
MARK XLII
TOURING
CAR



30-35
HORSEPOWER
HONEST RATING

This car introduces important new features suggested by a year's experience and perpetuates the best points of the COLUMBIA MARK XLI of Chicago-New York Record and Endurance Run fame. MARK XLII has a 106-inch wheel base and pressed steel frame with the chassis entirely independent of the body. The four-cylinder engine, nominally rated at 30 h. p., but having developed 35 h. p. in actual tests, has mechanically operated inlet and exhaust valves and exclusive improvements in the spark-timing, lubricating and controlling devices. The material of the entire car is so distributed as to give the maximum of strength with the minimum of weight, making it the lightest car of equal power ever built for touring. Price, with standard tonneau body, \$4,000. Canopy top, \$300 extra. Special prices for Aluminum, Limousine or Surrey bodies.

MARK XLIII
LIGHT
TONNEAU



12-14
HORSEPOWER
HONEST RATING

MARK XLIII has a two-cylinder opposed engine forward in a removable bonnet, bevel gear rear axle drive, sliding gear transmission with three speeds forward and one backward, direct drive on the high gear, and a foot operated friction clutch which is self-compensating for wear. The machine can be run at a speed of thirty miles per hour on the level and is a first class hill climber on the high gear. Lubrication is automatic. The carburetor permits use of kerosene in emergencies. Entirely new features in the control system make this the easiest of all gasoline cars to operate. The body is noticeable for its exceedingly handsome lines and convenient disposition of seat room. The tonneau seats are of full carriage size. All materials and workmanship are of the very best and the car is of the highest grade in every detail, great or small. Canopy top, \$200 extra.

A Catalogue of Columbia Gasoline Cars and Electric Pleasure Vehicles will be sent on request; also separate Catalogues of Electric Town Carriages of the coach class and Commercial Vehicles.

ELECTRIC VEHICLE CO., Hartford, Conn.

New York Branch: 134-136-138 W. 39th St.

Chicago Branch: 1413 Michigan Ave.

Boston Branch: 74-76-78 Stanhope St.

Member Association of Licensed Automobile Manufacturers.

STEARNS



STEARNS 24-HORSEPOWER GASOLINE TOURING CAR

Our Policy is **IMPROVEMENT** Not Alteration

Stearns Cars Can Be Seen, Not Heard.
Remember the Record of No. 35 in the
Endurance Run.

Write for catalogue and booklet describing the
Endurance Run and return trip to New York.

THE F. B. STEARNS CO.

Licensed under Selden Patents

Euclid and Lake View Aves.

Cleveland, U. S. A.

California Branch: A. P. WORTHINGTON, 331-333 So. Main St., Los Angeles

TWO NEW AUTOMOBILE TIRES

*The
Instantaneously
Detachable*
DUNLOP

Introducing an entirely new departure in rim construction. ∴ Its detachable side flanges or beads are removed by the simple loosening of a screw, leaving a flat faced rim, from which the tire can be removed "like slipping a belt off a pulley"—a loose belt at that,

AND

The
**HARTFORD
CLINCHER**

made under the G & J patents. This tire combines all the excellent qualities of that construction with many improved features of its own, hitherto characteristic only of **the foreign** makes

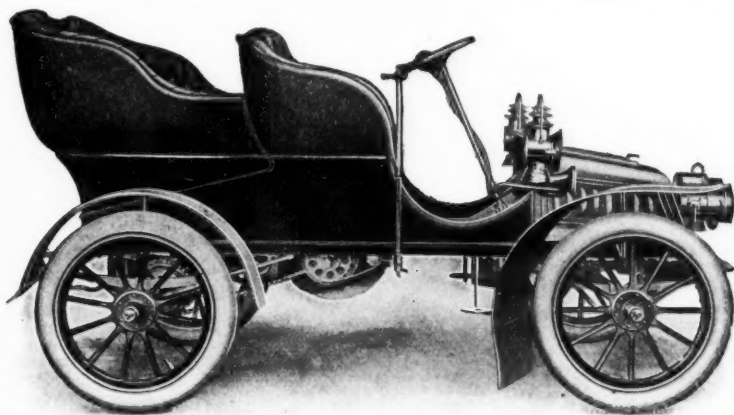
THE HARTFORD RUBBER WORKS CO.

HARTFORD,

CONNECTICUT

BOSTON NEW YORK PHILADELPHIA BUFFALO CLEVELAND DETROIT CHICAGO MINNEAPOLIS DENVER SAN FRANCISCO

POPE Hartford



WITH TONNEAU

Equipped with Tonneau
and Side Lamps

\$1200

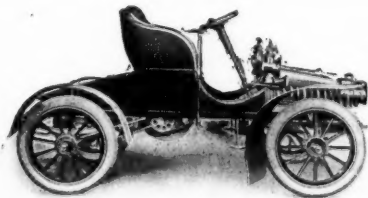
Without Tonneau, but
with Side Lamps

\$1050

**HORN and HEAD-
LIGHT Extra**

With an Automobile of POPE QUALITY you are always on time

These models maintain the same high standard which has always characterized the product of the Columbia Bicycle Factory, where the **POPE-HARTFORD** is produced



WITHOUT TONNEAU

The finest mechanical skill, backed by ample capital and unbounded energy, has made our product known the world over as the Standard. The careful buyer cannot fail to recognize the advantages which must arise from our long experience and enormous resources.

KEEP YOUR EYE ON THE "POPE-HARTFORD"

FOR SALE AT OUR DEPOTS:

NEW YORK, 12 Warren Street.

WASHINGTON, 819 Fourteenth Street, N. W.

BOSTON, 221 Columbus Avenue.

PHILADELPHIA, 909 Arch Street.

PROVIDENCE, 12 Snow Street.

HARTFORD, 436 Capitol Ave.

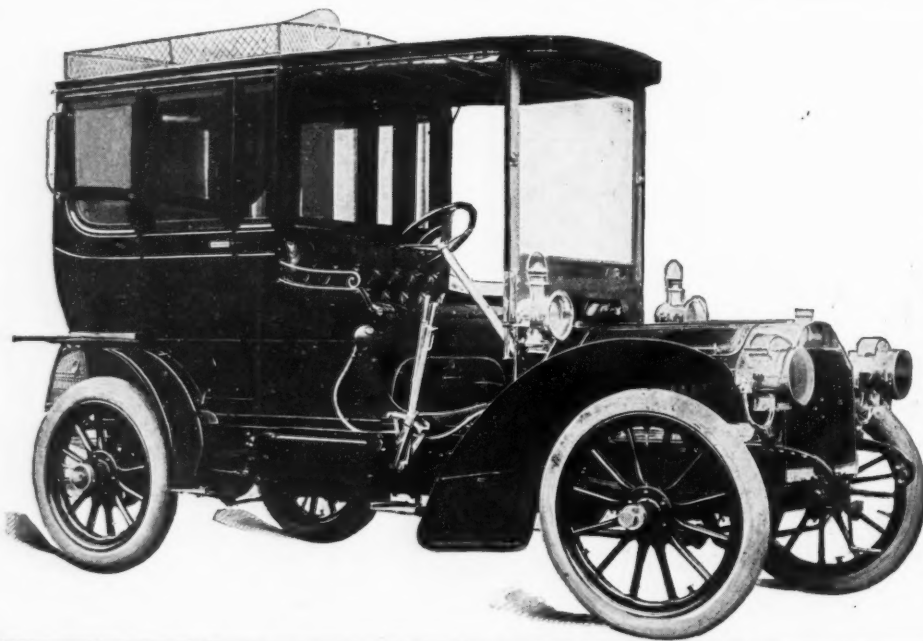
WE CARRY A COMPLETE LINE OF AUTOMOBILE SUNDRIES.

POPE MANUFACTURING CO., Eastern Department, **Hartford, Conn.**

Members Association Licensed Automobile Manufacturers.

Few Things are So Important in Motor Car Construction as
the System of

Lubrication



The PEERLESS system of lubrication has more points of efficiency than any other system ever devised. The oil tank is on the dash, has forced "sight" feeds, oils every working part of the engine automatically. Feeds are mechanically driven, and consequently cannot fail to act. In cold weather the oil is perfectly heated.

This is only one of the many points of PEERLESS PERFECTION. The catalogue tells the rest.

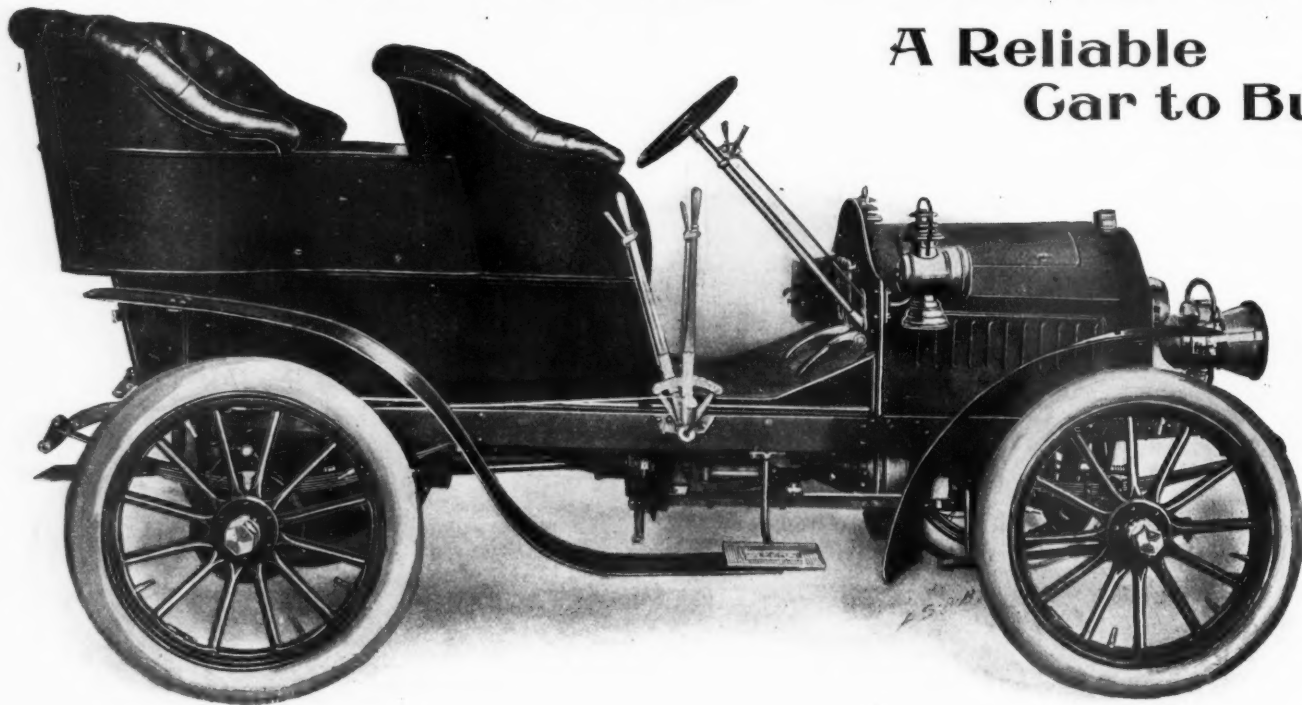
***The Peerless Motor
Car Company***

Cleveland, Ohio

Member Association Licensed Automobile
Manufacturers

THE ROYAL TOURIST

**A Reliable
Car to Buy**



\$2300

Model "O" 18 H. P. Aluminum Bodies 10-day Delivery
THE ROYAL MOTOR CAR CO., CLEVELAND, O.

NOTICE

USERS, AGENTS, IMPORTERS, DEALERS AND
MANUFACTURERS OF

Gasoline Automobiles

United States Letters Patent No. 549,160, granted to George B. Selden, November 5, 1895, controls broadly all gasoline automobiles which are accepted as commercially practical. Licenses under this patent have been secured from the owners by the following named:—

MANUFACTURERS

Electric Vehicle Co.	The J. Stevens Arms & Tool Co.
The Winton Motor Carriage Co.	H. H. Franklin Mfg. Co.
Packard Motor Car Co.	Smith & Mabley, Inc.
Olds Motor Works	The Commercial Motor Co.
Knox Automobile Co.	Berg Automobile Co.
The Haynes-Apperson Co.	Cadillac Automobile Co.
The Autocar Co.	Northern Mfg. Co.
The George N. Pierce Co.	Pope-Robinson Co.
Apperson Bros. Automobile Co.	The Kirk Mfg. Co.
Locomobile Co. of America	Elmore Mfg. Co.
The Peerless Motor Car Co.	E. R. Thomas Motor Co.
Standard Motor Construction Co.	Buffalo Gasoline Motor Co.
Waltham Manufacturing Co.	Pope Manufacturing Co.
Pope Motor Car Co.	The F. B. Stearns Co.
	The Sandusky Automobile Co.
	Crest Manufacturing Co.

IMPORTERS

Smith & Mabley, Inc.	Standard Automobile Co.
Central Automobile Co.	E. B. Gallaher
Alexander Fischer.	Auto Import Co.
Hollander & Tangeman	American Darracq Automobile Co.
Sidney B. Bowman Automobile Co.	Controlled by F. A. La Roche Co.

These manufacturers are pioneers in this industry and have commercialized the gasoline vehicle by many years of development and at great cost. They are the owners of upwards of four hundred United States Patents, covering many of the most important improvements and details of manufacture. Both the basic Selden patent and all other patents owned as aforesaid will be enforced against all infringers.

No other manufacturers or importers than the above are authorized to make or sell gasoline automobiles, and any person making, selling or using such machines made or sold by any unlicensed manufacturer will be liable to prosecution for infringement.

A suit was commenced on Oct. 22d against a dealer, and against a manufacturer infringing United States Letters Patent No. 549,160.

A suit was commenced Nov. 5th, against a purchaser and user of an automobile infringing the same patent.

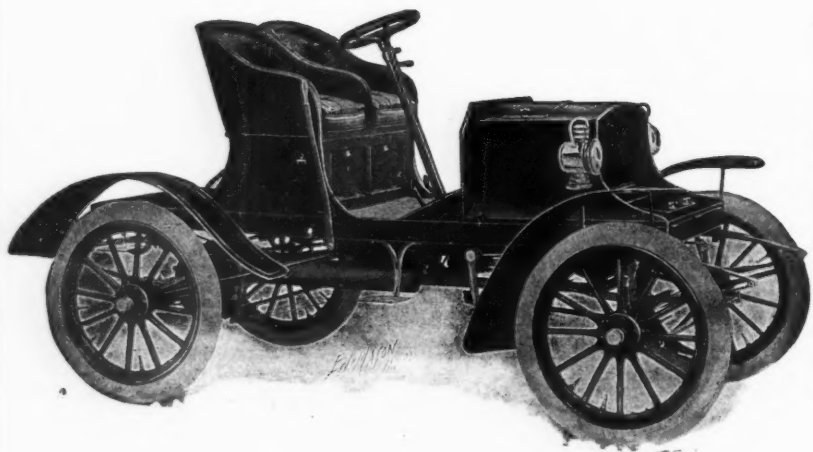
A suit was commenced December 28th, 1903, against an importer of automobiles infringing the same patent.

Association of Licensed Automobile Mfrs.
No. 7 EAST 42d STREET, NEW YORK

Premier Air Cooled

"THE QUALITY CAR"

Weight, 1250 pounds without tonneau.
Weight, 1400 pounds with tonneau.



HORSE power 16. Four cylinders. Air cooled. Engine under bonnet. Transmission located on counter shaft, mounted on roller bearings. One lever for both speeds. Tonneau detachable. 82-inch wheel base, 32x3½-inch wheels. Inclosed rear axle. **MORE HORSE POWER PER HUNDRED POUNDS THAN ANY CAR BUILT IN AMERICA.** Simplicity—Speed—Ginger—Our idea of a good motor car. No vibration—full elliptic springs that make our car ride like a Pullman. Speed and power to roar up hills—And if it does need repairs, our engine is the most accessible ever built. We prove our statements to buyers and agents. Write for catalogue.

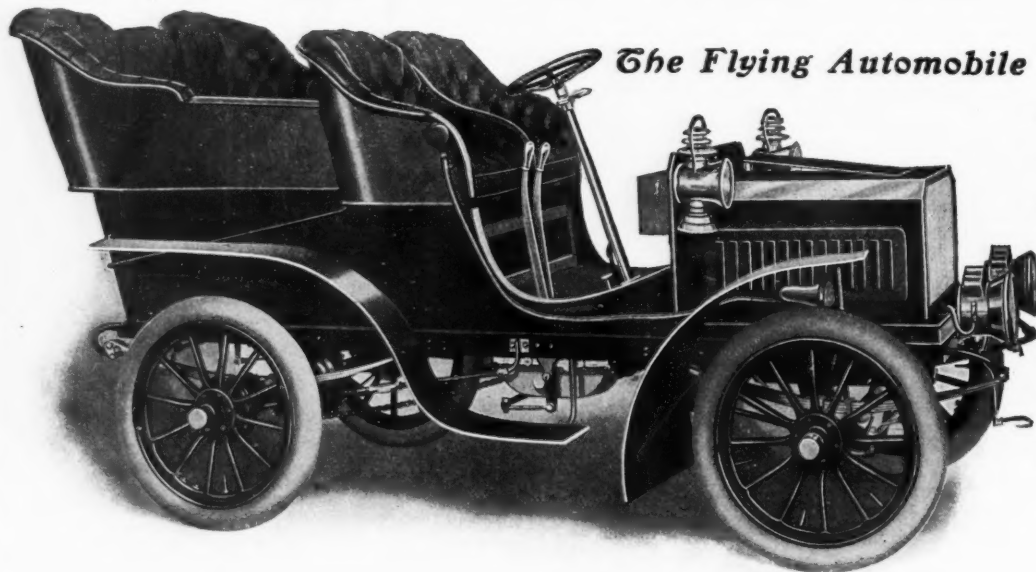
Premier Motor Mfg. Co., Indianapolis, Ind.

\$2,000

AIR-COOLED

\$2,000

The D U M O N T



The Flying Automobile

Built to go. Easy riding. Four cylinders. Weight, 1800 lbs. Made to stand ample power. 20 h. p. Over one horse power to each 100 lbs. Its elegance of appointment recommends it to people of quality.

**A Good Proposition
for Agents.**

\$2,000

Columbus Motor Vehicle Co.
COLUMBUS, OHIO.

\$2,000

CLASSIFICATION ... WHY? DISTINCTIVE

THE LIGHTEST
THE STRONGEST
MOST DURABLE
MOST EFFICIENT
BEST FINISHED



ABSOLUTELY SAFE
PERFECTLY CLEAN
BEST TO RIDE
MOST ECONOMICAL
TO KEEP

THE BAKER ELECTRIC

Attractive in Rich Finish and Design. ✱ Simply Manipulated. ✱ Always Satisfactory.
A Carriage Any Lady Can Drive.

SEND FOR OUR B K CATALOG.

THE BAKER MOTOR VEHICLE CO., Cleveland, Ohio.

CRESTMOBILE

Ample Power

Shaft Drive

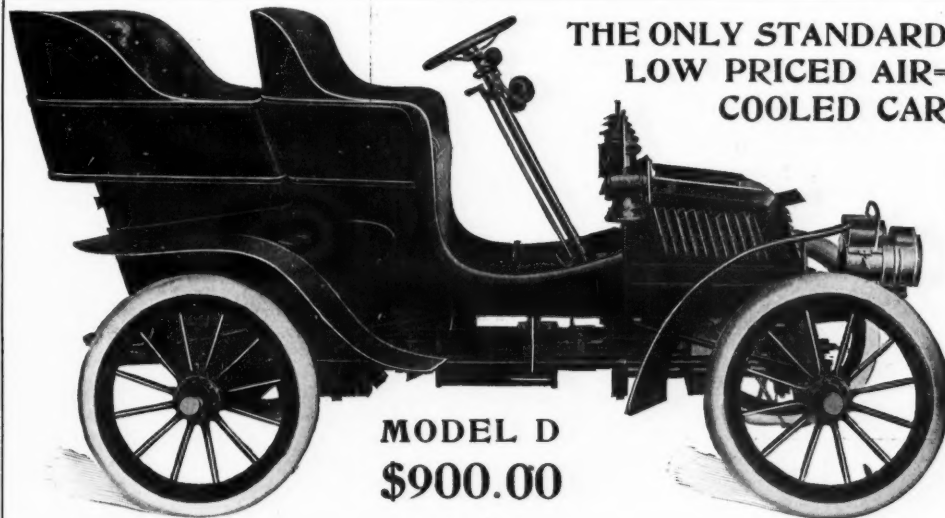
No Vibration

Simplicity

Thoroughly Practical

Luxurious Finish

Tried Reliability



THE ONLY STANDARD
LOW PRICED AIR-
COOLED CAR

MODEL D
\$900.00

The Crestmobile has won its own reputation by merit. It runs every day in the year, costs little to maintain, sells quickly and pleases users. The Crest factory is large and can deliver promptly. Other Models \$650 to \$1250.

Member of the Association of Licensed Automobile Manufacturers

CREST MFG. CO., Cambridge, Mass., U.S.A.

For more detailed information

The Locomobile

GASOLENE TOURING CAR



Equal to the best imported cars in material, workmanship and finish, but better adapted to American conditions.

A TRUE SIMPLEX

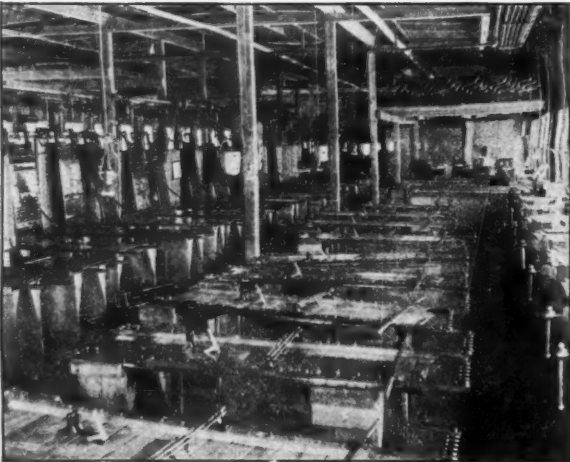
TWO Cylinder and Four Cylinder Touring Cars, Front Vertical Motors used exclusively. Prices from \$2,000 upwards. Place your order early and avoid delay in delivery.

The Locomobile Company of America, Bridgeport, Conn.

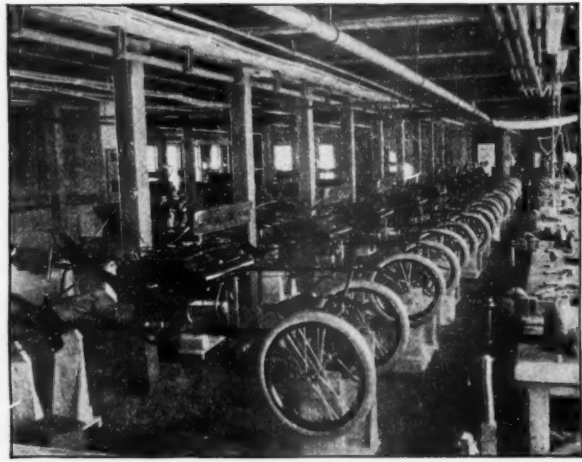
BRANCHES: — NEW YORK, Broadway and 76th St.; PHILADELPHIA, 249 North Broad St.; CHICAGO, 1354 Michigan Ave.; BRIDGEPORT, Factory at Seaside Park; BOSTON, 15 Berkeley St.

Member Association of Licensed Automobile Manufacturers.

ORIENT BUCKBOARDS



HOW
THEY
ARE
ASSEMBLED



WE believe that few realize the enormous demand which has sprung up for this handy little vehicle, or appreciate the extent of the preparations we have made for supplying them. For the benefit of those who cannot visit our factory, we illustrate two of the assembling rooms where Buckboards are put together. These rooms together hold one hundred machines in process of assembling. The first assembling room, at the left, is where the machines are set up ready for wheels, motors, wiring, etc., for which they are brought down to the lower and finishing room, shown at the right, after which they pass to the testing and inspecting rooms. The output from these two rooms is from twenty to twenty-five complete Buckboards per day. :: :: :: :: ::

∴ THOSE WHO HOLD THE AGENCY FOR THE ORIENT BUCKBOARD HAVE THE BEST SELLING MOTOR VEHICLE IN THE WORLD. ∴

WRITE FOR NEW CATALOGUE AND AGENTS' PRICES.

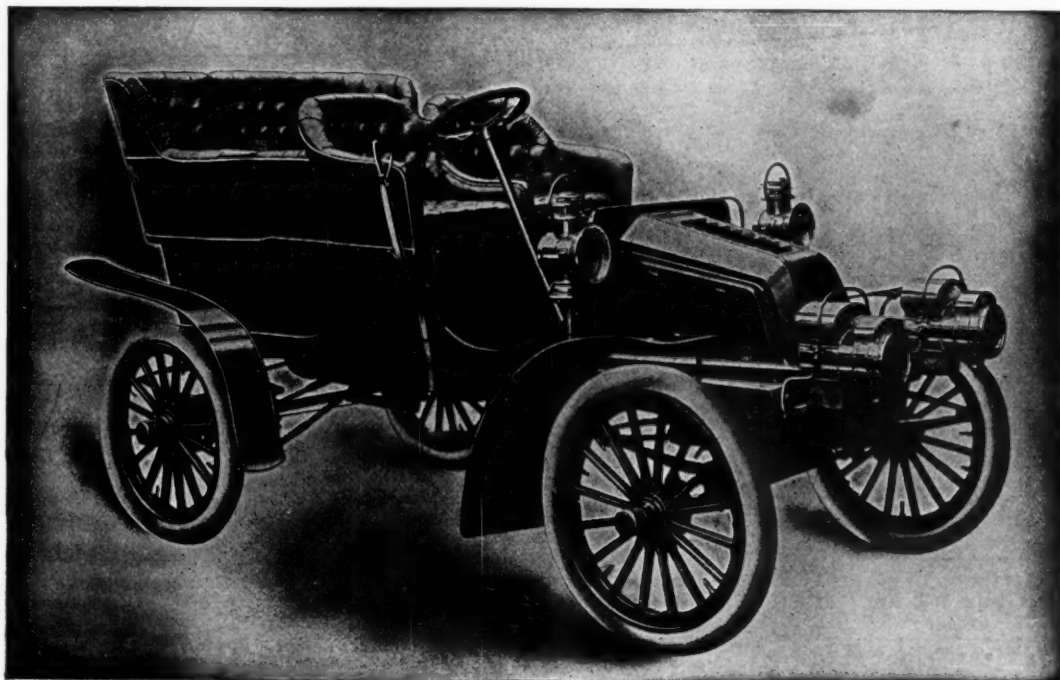
Waltham Manufacturing Co.

WALTHAM, MASS.

You Know This Car! It is the....
Tried and True

FREDONIA

which never failed in the severest tests of last season



WE

await your decision relative to our new 2-cylinder car, which constituted an interesting part of our Chicago Show Exhibit. WE think it is the "real thing" and are prepared to show

YOU

Fredonia Mfg. Co.
Youngstown, Ohio



CHICAGO AGENT:

Western Automobile Co.,
1303 Michigan Avenue.

"IMPERIAL" Gasoline Automobiles

DOUBLE OPPOSED
AIR-COOLED MOTOR

ARE ALWAYS READY
THE HOTTEST DAYS OF SUMMER.
THE COLDEST DAYS OF WINTER.

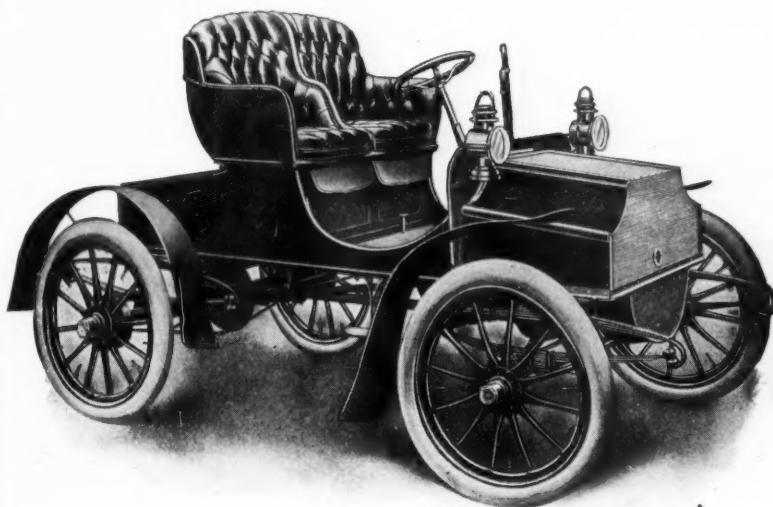
BEVEL GEAR DRIVE
SLIDING GEAR TRANSMISSION

WE MANUFACTURE 4 DIFFERENT MODELS

- Model A. Open Runabout
- Model B. Runabout Furnished with Falling Top or Doctor's Top
- Model C. Delivery Wagon
- Model D. Full Glass Doctor's Car

HAS ALL THE LATEST IMPROVEMENTS

Our "IMPERIAL" Automobiles are driven by double opposed air-cooled engines (no water, no radiator coils, no pump), placed in front, away from all dirt and dust. All parts accessible by simply lifting the hood. Has bevel gear drive instead of sprocket chain. Sliding gear transmission. Two brakes. Automatic spark timer. Forced feed oiler of large capacity. Tilting steering wheel. Our spring suspension we claim is the most practical and best ever shown on any automobile. Body of handsome design, roomy and comfortable, and with ample room back of seat for carrying a number of parcels. Upholstered in the finest quality of leather.



IMPERIAL MODEL "A"

AGENTS WANTED IN UNOCCUPIED TERRITORY
BOOKLET ON APPLICATION

RODGERS & CO., COLUMBUS, OHIO, U. S. A.



ontinental Tires



Have aroused a great deal of interest at the

**Chicago
Automobile
Show.....**

The manufacturers were surprised at the number of purchasers specifying Continental Tires. Some of them grumbled at the slight difference in cost, but most of them freely admitted that they were willing to put on **the best tires** if the purchasers **demand it**.

You can have Continentals on **your** machine if **you insist**. Continental Tires hold the world's records from one to fifty miles and all long distance road records. Send for Gordon Bennett booklet.

Factory:
Hanover, Germany

THE CONTINENTAL CAOUTCHOUC CO.

Am. Office, 298 Broadway, NEW YORK
EMIL GROSSMAN, - Manager

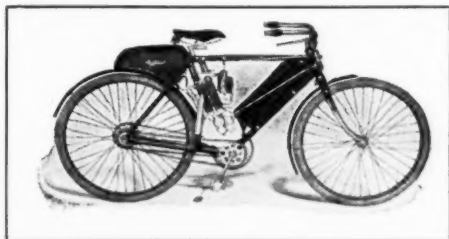


A Tire with a Reputation

The G. & J. Tire has quality in its construction and years of experience in detachable tire construction back of it.

G & J TIRE CO.

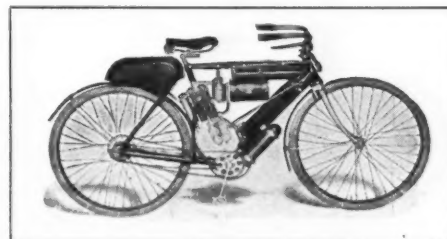
Indianapolis, Ind.



SAFE

Frame scientifically constructed of material tested by chemical analysis. Absolute control by one lever.

SPEEDY



Four-cycle, high compression, jump spark gasoline engine develops much more than the rating of $1\frac{3}{4}$ horse-power. Speed from 5 to 30 miles an hour with great reserve power.

COMFORTABLE

Spring front fork absorbs vibrations from bad roads and pulsation of engine.

SIMPLE TO OPERATE.



Rambler...Crescent
Monarch...Imperial

Motor Bicycles

1 $\frac{3}{4}$ Horse-Power . . . Price \$225.00

POPE MANUFACTURING CO., Western Dept., CHICAGO, ILL.

AUTOMOBILE PARTS

PRESSED STEEL FRAMES

Made of cold rolled steel and supplied with or without forgings, assembled or as frame members. Send for descriptive circular.

AXLES

Front—tubular and forged, with steering pivots and cross connection; rear—chain or bevel gear drive, with ball, roller or plain bearings.

STANDARD TRUCK PARTS

Including front axle, steering gear, suspension and transmission gear, hub and countershaft brakes, and electric motive power.

OTHER PRODUCTS

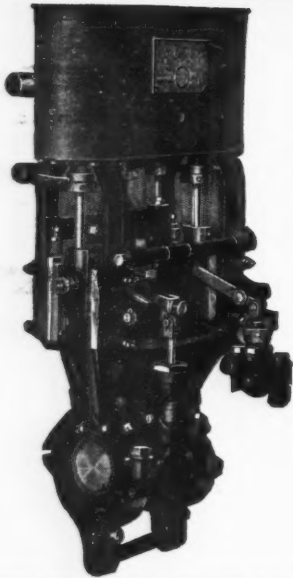
We also make "Diamond" chains, "High Duty" steel balls, change and transmission gears, pressed steel and malleable hubs, engine cranks and mufflers.

CATALOG NO. 1 DESCRIBES LIGHT PARTS

CATALOG NO. 2 DESCRIBES HEAVY TRUCK PARTS

FEDERAL MANUFACTURING COMPANY—CLEVELAND, OHIO

SELLING AGENT—HAYDEN EAMES, AMERICAN TRUST BLDG.—CLEVELAND



The "NEW MASON"

(Model "C")

includes all of the many excellencies of the original Mason Engine, with additional features, which give it a still greater lead ahead of all other steam auto engines.

Every part of the Mason Engine has been critically gone over, and wherever possible, improved, strengthened and perfected in every smallest detail.

We have made, operated and repaired more steam auto engines than any other concern, and have concentrated in the "Model C" all of the experience gained by this wide observation of all other engines.

THE "NEW MASON" Model C

We do not claim that **The Mason "Model C"** is a perfect engine, but do positively affirm, and are ready to back up our affirmation, that it is, from every standpoint,

THE BEST AUTO ENGINE IN THE WORLD.

Our "Model C" catalogue will tell you all about this engine, and prove interesting to every autoist. It will be a pleasure to mail you a copy. Send postal card for it to-day.

A full line of parts for all Mason Engines will be found at 147 Queen Victoria St., London, England.

THE MASON REGULATOR COMPANY, - - 158 Summer Street, BOSTON, MASS.

Kindly mention this publication in writing.

LACKAWANNA

IS SYNONYMOUS WITH

QUALITY in MOTORS

Single Chain Drive Transmission.

Double Chain Drive Transmission.

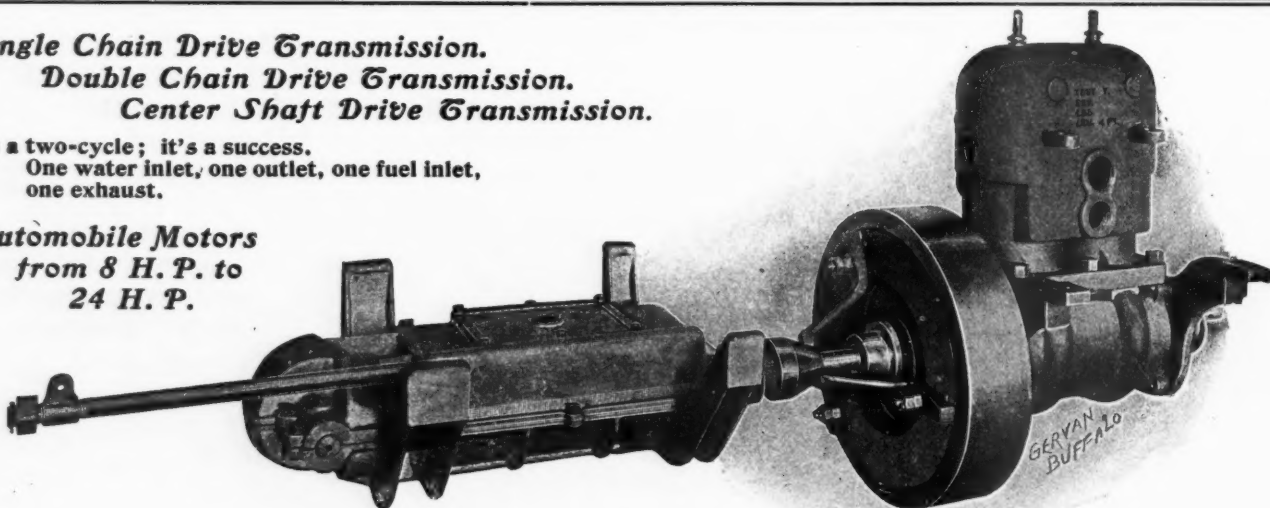
Center Shaft Drive Transmission.

It's a two-cycle; it's a success.

One water inlet, one outlet, one fuel inlet,
one exhaust.

Automobile Motors

*from 8 H. P. to
24 H. P.*



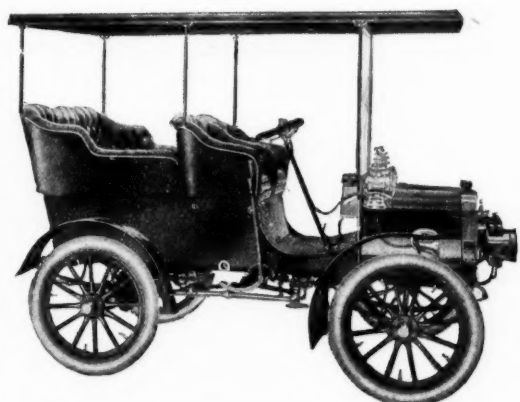
Single Chain Drive Transmission and Clutch Coupled to Motor

For Prices and Points of Merit, Address

LACKAWANNA MOTOR CO., 50 Letchworth Street, Buffalo, N. Y.

Are
You
With
Us?

COL. SPRAGUE'S \$100.00 CANOPY



A SPRAGUE CANOPY—CONCEALED CURTAINS

With Concealed Curtains—Weights About 65 lbs.
Complete.

We also make a \$200 Canopy.
We make park canopies for
ladies' use on runabouts and
light touring cars. Cape cart
covers (or three bow tops).

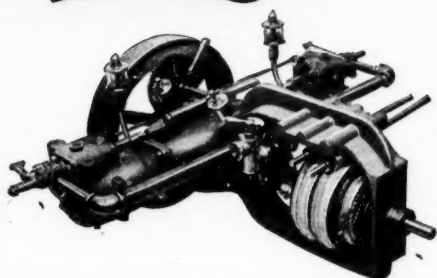
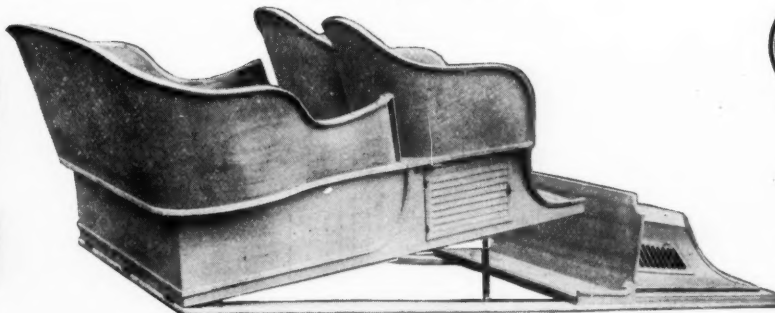
The Sprague Umbrella Co. NORWALK
OHIO



WHEN VISITING

The World's Fair

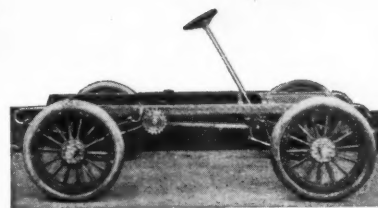
CALL ON US



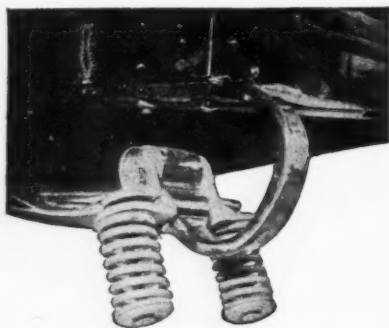
We manufacture and sell all the parts
for Automobiles. Our new prices will
interest you.

J. H. NEUSTADT CO.

826 So. 18TH ST. - - ST. LOUIS, MO.



**Would
You?
Would
I?**



Oakland, Cal., 27th Oct., 1903.

The Graham Co.,
Park Sq. Auto Station,
Boston, Mass.

Dear Sirs: I notice your "ad" of the GRAHAM Supplementary Spiral Springs, and as I am tired of paying for broken leaf springs for my touring car I will try your springs which you will ship to me by Wells-Fargo, C.O.D., with full instructions to apply the same.

Yours truly,

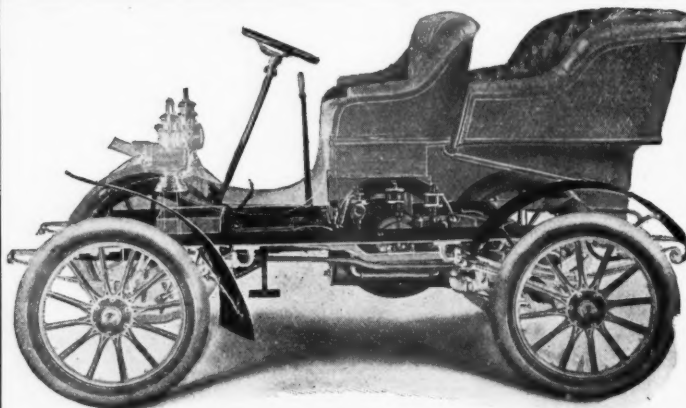
This is the regular thing by every mail.

WOULD I?

THE GRAHAM CO.

41 Columbus Ave., BOSTON, MASS., U. S. A.

The **Elmore**



THE makers of the Elmore take this occasion of thanking their brother manufacturers and thousands of good friends who pronounced this luxurious little car the one distinct departure from conventional types shown at the automobile show in New York. The economized energy of the Elmore two-cycle engine; the speed and perfection of control attained, and the extraordinary beauty of the rich roll tonneau; all taken in connection with the moderate price created an immediate and enduring sensation.

But half the Elmore story has not been told until you've seen our new catalogue; read the convincing little brochure "A Long Jump and Two Short Steps," and, above all, ridden in this remarkable runabout.

Write to-day for literature.

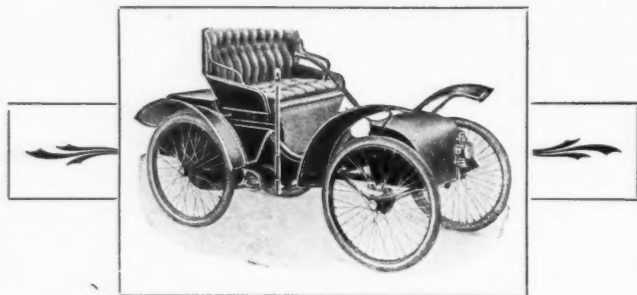
Elmore Mfg. Co., 804 Amanda St., Clyde, Ohio

Members Association Licensed Automobile Manufacturers.

Are You Going to Buy an Auto?

If so, why not
INVESTIGATE

THE MICHIGAN



PRICE, \$475.00

HERE IS WHAT ONE USER SAYS:

Mansfield, O., Sept. 30, '03.
Replying to yours of the 29th, will say that my experience with the Michigan Runabout during the time I have owned it, nearly seven weeks, running 621 miles, is very satisfactory indeed. The machine does all you claim for it. Very easily controlled. As you are aware, this is a very hilly country, but it has not failed to go up any hill I have tried. On the 2d inst. I covered 98 miles on three gallons of gasoline, making the run in seven hours. The beauty of the machine is its simplicity and easy steering on country roads. It has cost me for repairs twenty-five cents. I have nothing but praise for it and like it better every time I go out.
W. C. HERING.

....ASK THE USER....

MICHIGAN AUTOMOBILE CO., Ltd., Makers
KALAMAZOO, MICH.

The
**STUDEBAKER
AUTOMOBILE**

ELECTRIC

With Exide or Edison Battery

RUNABOUTS SURREYS DELIVERY WAGONS
STANHOPE VICTORIAS AND TRUCKS

GASOLINE

TOURING CAR—Light and Powerful

"The Automobile with a Reputation Behind It"

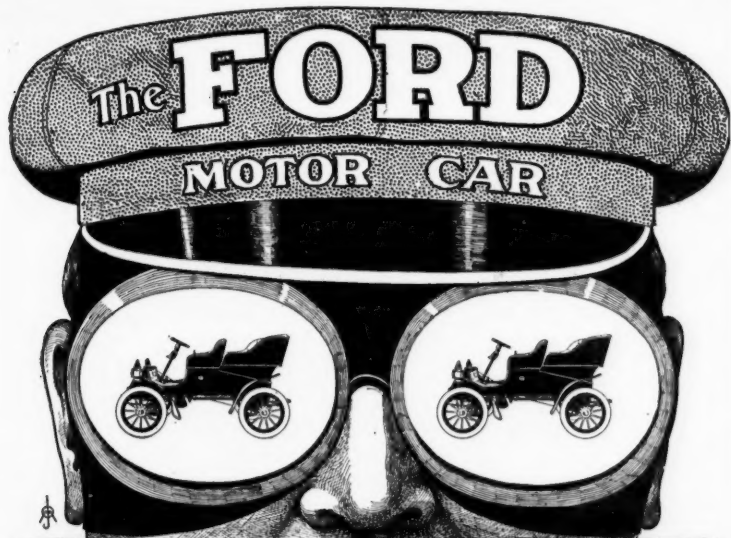
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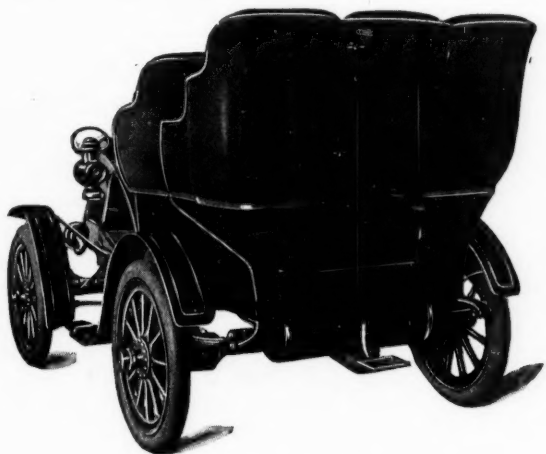
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The Ford Keeps the Price Down. You have to pay the Trust \$1500 for a tonneau car with a double opposed motor. The Ford is the pioneer of this type machine and it is the lowest priced automobile of its class in the world. Write for illustrated catalogue and name of nearest agent.

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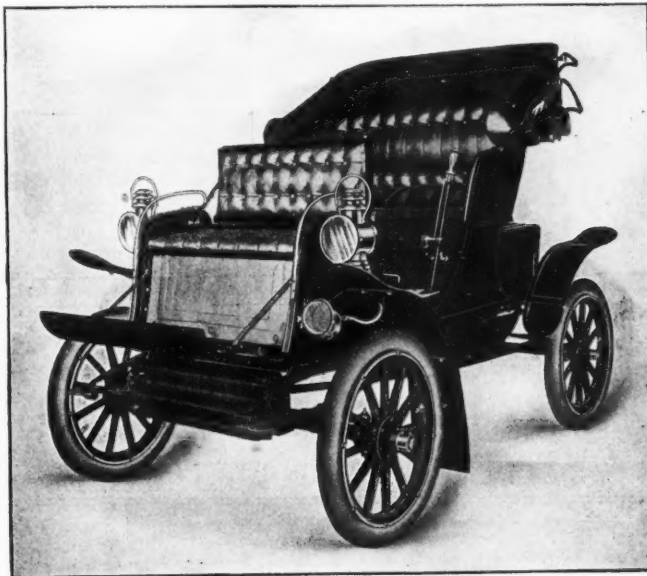
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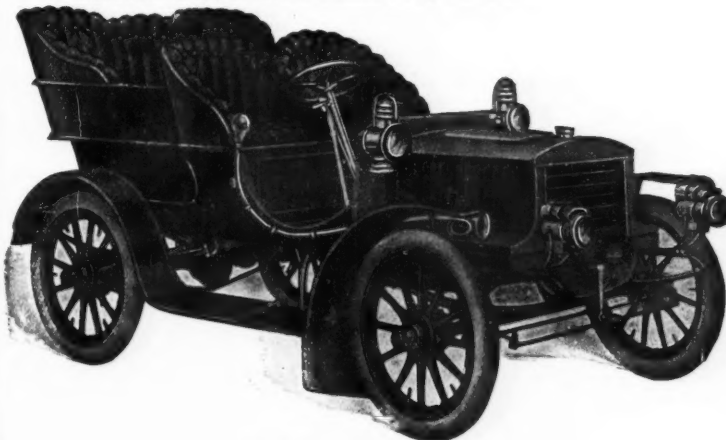
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Bevel gear drive with sliding gear transmission, three speeds ahead and reverse.
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 Beautiful in appearance and handsomely finished.



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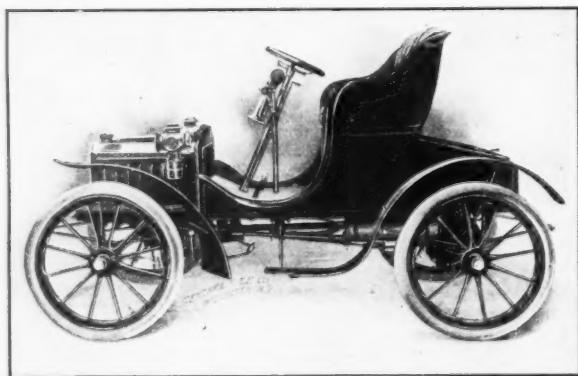
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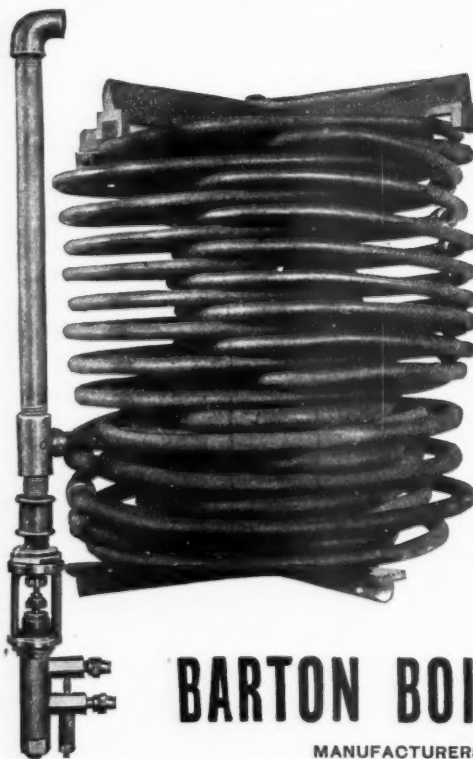
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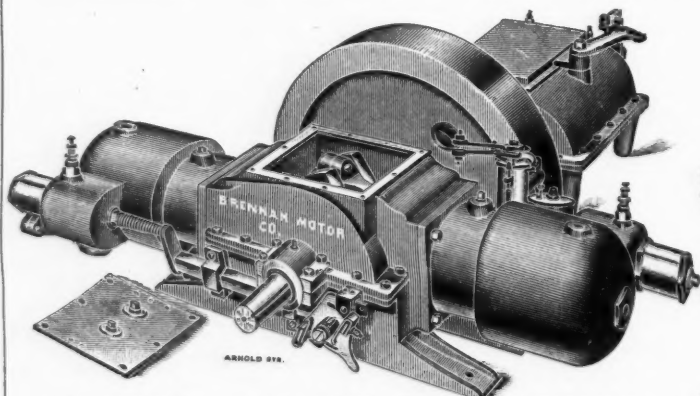
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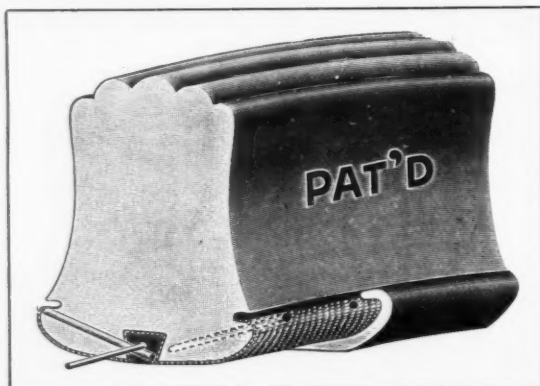
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THE LAMP MAKER IS DOWN AND OUT.

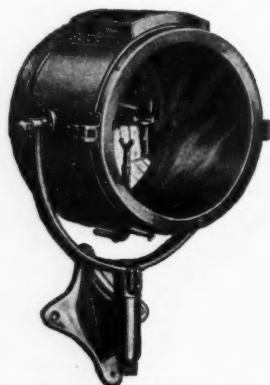
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SIMPLICITY IS THE
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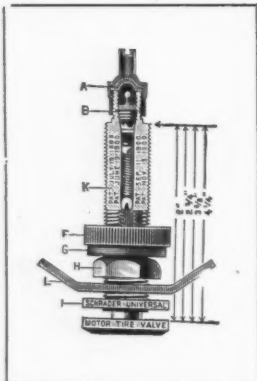
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They will suit you.



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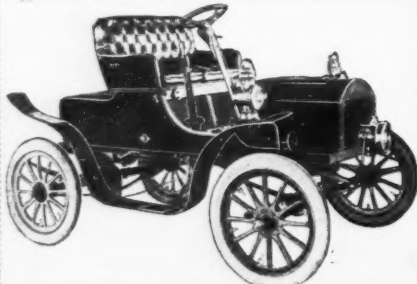
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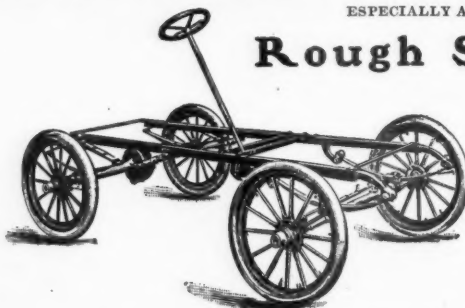


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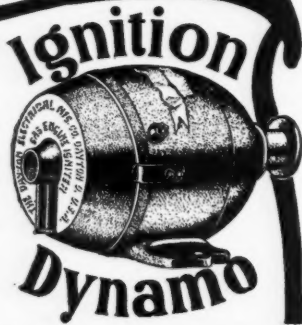
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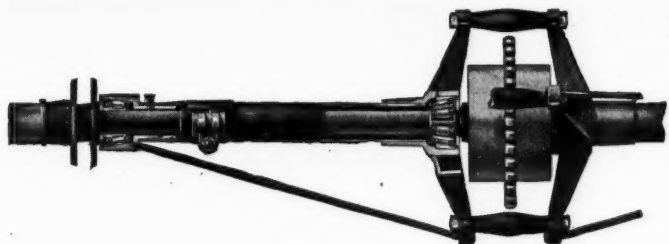
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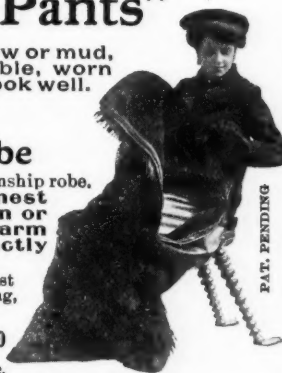
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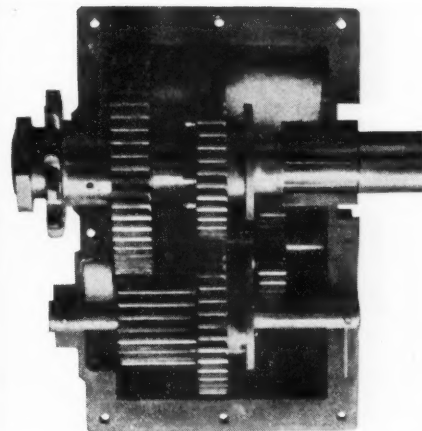
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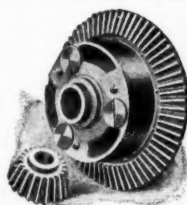
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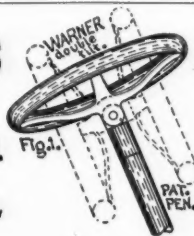
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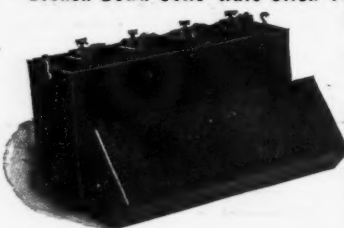
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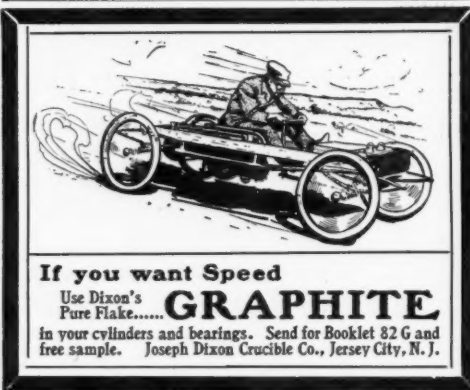
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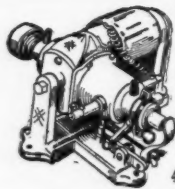
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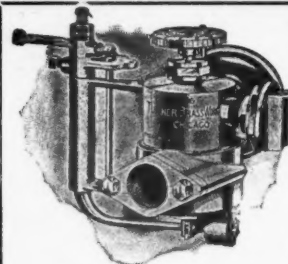
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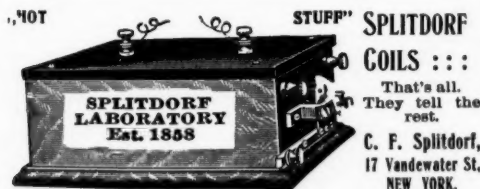
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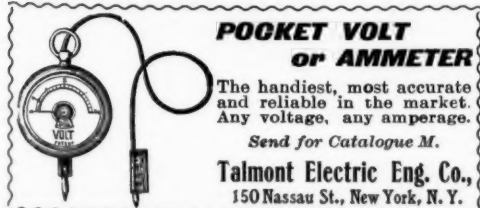
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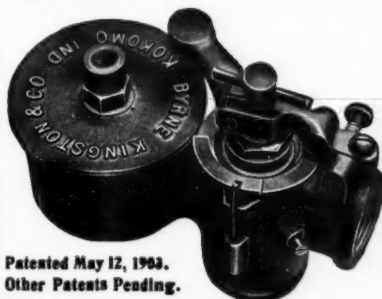
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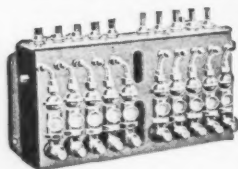
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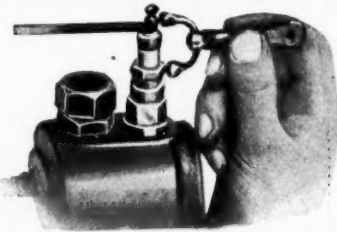
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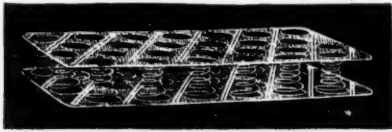


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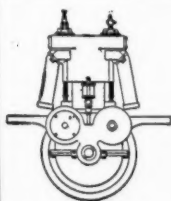
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Knox Automobile Co.....	1 "
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